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ABSTRACT

This research was designed to assess the effects of various curriculum materials and different levels of teacher training on the cognitive, intellectual, and language development of full-year Head Start children who were given intensive language training. The curriculum materials used were the "Sullivan-Buchanan Readiness Program," the "Sullivan Enrichment Supplement," the "Swanson Supplement," and the "Reinstein Reinforcement Program" which are described in detail. There were three control groups and 10 experimental groups (five each of English and Spanish speakers) grouped according to curriculum materials and levels of teacher training. Children were pre- and posttested on a battery of language and intelligence tests to determine the extent of changes in their language competence. There were significant pretrial intergroup differences on the dependent variables; however, results must be seen in the light of differing subject populations. The experimental groups who received a structured language program showed more improvement than the control groups who did not. More than one-half of this document is comprised of data in tabular form. (MH)

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ON

HEAD START EVALUATION AND RESEARCH: 1968-69

TO

THE OFFICE OF ECONOMIC OPPORTUNITY
(Contract No. OEO-4115)

CHILD DEVELOPMENT EVALUATION AND RESEARCH CENTER

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August, 1969

CURRICULAR INTERVENTION TO ENHANCE THE ENGLISH LANGUAGE COMPETENCE OF HEAD START CHILDREN

John Pierce-Jones
Grover Cunningham

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Curricular Intervention to Enhance the English Language Competence of Head Start Children

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Several researchers (e.g., Ausubel, 1964; Grey and Klaus, 1965; Hunt, 1967) have argued that the environments of disadvantaged children work to the detriment of motivational, social, and verbal skills needed in order to adapt to the dominant culture. Hunt (1967) invokes the idea of "competence" in dealing with these deficiencies in deprived children and has indicated that competence deficiencies seriously handicap the young child's attempts to adapt cognitively and in other ways to the demands of the school.

Project Head Start has been aimed since its inception at producing improvements in many aspects of the preschool child's readiness to deal with the demands of the elementary school. In a word, then, Head Start has been expected to generate greater competence in the young child.

The Problem

The purpose of this investigation was to determine the extent to which intensive intervention in the entire curricular structure of a "full year" Head Start Program of preschool education would increase (a) components of a child's measured reading readiness; (b) his "overall" reading readiness; and (c) his "psycholinguistic" abilities and development as measured by the Illinois Test of Psycholinguistic Abilities.

Curricular Intervention

The general design of this investigation, and the basic research questions addressed, will be described in a later section of this report. At this juncture, since intensive curricular intervention constituted the major treatment to be assessed for its effects on Head Start children, we will present a relatively thorough description of the components of the experimental curriculum. It should be understood at the outset that the curricular intervention was applied only in certain classes designated as "experimentals." It was omitted from certain other classes designed as "controls."

Readiness in Language Arts: A Programmed Approach[1]

During the year 1968-69, the Child Development Evaluation and Research Center at The University of Texas at Austin, incorporated a basic intervention program for socially disadvantaged preschoolers (Head Start) in the Austin Public School System, involving ten experimental classes. The aim of the program was to enhance the school readiness of the children in their language skills. The intervention program consisted of the daily use of a commercially sold basic Readiness in Language Arts series (Sullivan Associates) and certain educational supplements, one designed by Rebecca Swanson of the University of South Carolina, the other, published by Sullivan Associates. Two of the experimental classes were designated to use the Sullivan Associates Enrichment Materials, in conjunction with the basic program. Two other experimental classes were designated to use a supplement devised by the classroom teacher. The Reinstein Reinforcement Program was used in two of the experimental classes following the daily use of the Readiness in Language Arts series and the Swanson Supplement.

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[1] This section was drafted by Ann L. Maurer, Social Science Research Associate V.

This section will present a description of the various facets of the program involved: how each works, the principles upon which each program is based, its goals, teaching techniques and expected accomplishments.

The texts in use that are discussed here are:

1. Readiness in Language Arts, Cynthia Dee Buchanan, (Sullivan Associates)
2. Sullivan Enrichment Supplement
3. Swanson Supplement
4. Reinstein Reinforcement Program developed for Head Start Intervention

The basic readiness program consists of the following materials: six programmed demonstration books on a wooden easel, six teacher's manuals, and two alphabet charts.

The Readiness in Language Arts series, developed by M. W. Sullivan and authored by Cynthia Dee Buchanan, is a relatively new approach to the preparation of children for reading, and it is significantly different from traditional basal readers in both form and content. The Readiness in Language Arts series is a programmed instructional method designed for use by preschool and first grade classes. The author of the program has accomplished a blending of informality with the "magic of programming" which permits the child to learn without the use of pencil and paper.

The Buchanan Program relies heavily on a phonic-linguistic approach. The program is designed to start the child on the letters and their sound values and to control vocabulary on a spelling regularity principle. Although the programmed reading series claims to be linguistically based, it teaches the relation between sounds and letters, has the child isolate sounds, and encourages blending. Again, the Buchanan programmed method differs from conventional materials by containing discrete words and sentences with humorous illustrations and a definite "story line."

The Buchanan series is based on the adventures of a lion and tiger through alphabet-land, capturing the imagination of the child. The program proceeds permitting the teacher to ad lib in conjunction with the programmed text. The six programmed texts are designed in bold, forceful colors with over-sized illustrations. Each is accompanied by a teacher's manual which provides a programmed teaching format. All student responses in the Buchanan Program are oral responses. The teacher's goal, as planned by the author, is to elicit responses and reinforce each one appropriately. The teacher is basically following the same type of programming that is done in a traditional programmed textbook.

Throughout the program the teacher is able to call for group responses as the children master the basic concepts. Grouping the students according to ability is recommended in order to avoid the situation in which the children most in need of making responses sit quietly, while only those students who already know the material benefit by responding. The author suggests praising the child even if his response is incorrect, informing the child his answer was very close and explaining why he is wrong. This technique permits the teacher to give praise to the child for his effort in giving the response. Also, this technique will generate an atmosphere for encouraging responses from all the children.

The following concepts are incorporated into the series of six programmed texts of the Readiness in Language Arts which will be described in further detail throughout this section:

1) Direction--left-right, up-down, top-bottom, under-over, first-last, front-back
2) Spatial Concepts--a straight line, curved line, circle, square
3) Colors--major, primary and secondary colors
4) Alphabet--all small and capital letters

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5) Sounds--long and short vowel sounds and most regular consonant sounds.

6) Words--112 two and three letter words made from sounds and letters are mastered in the program

Outline of Buchanan Readiness in Language Arts Texts

The materials to be used by the teacher in this series are six large books with easel and the Teachers' Programmed Manual to accompany each book. It is recommended that the wooden easel be placed in a prominent position in the classroom, making sure that each child has an unobstructed view of the Big Book. Each of the six Big Books in the Buchanan Program begins with the cover of the book being Lesson I, introducing characters and concepts which will later appear in the story sequence.

Each lesson is completely described for the teacher in the Lesson Plans section of the Teacher's Manual. It is advisable always to read the Lesson Synopsis before giving the lesson. The teacher always presents all the information in the teacher's key, but then is free to add information or to use any supplementary material, being careful to keep within the 30 minute time period.

It is recommended that the children should be praised lavishly. The following outlines are presented for each of the texts.

The 17 lessons of Book 1 may be divided into four main sections:

Introductory Lessons

This part of the program introduces the students to their first Big Book and accustoms them to responding orally at the teacher's direction. The following concepts are introduced and developed: the colors black, white, red, and green; left and right; and squares and circles.

The Story Sequence

The pages of the Big Book now become the setting for the adventures of the lion and the tiger. The main theme of the first story sequence is a humorous treatment of the animals' endeavors to get from one side of the page to the other. Their reactions to changing circumstances and their constant interaction with each other amuse and entertain, while giving the children practice in interpreting a series of related events.

As each animal explores the world on his side of the page, the children learn that investigation leads to discovery. They gain practice in identifying emotions, determining causes, describing actions, and predicting outcomes. In the course of the story sequence, the following characters are introduced and discussed: a lion and a tiger; a bird; a fox; a snake; a giraffe; a young boy, Pat, who becomes a 'teacher' to the animals.

Color Concepts

With the arrival of the young boy, color is introduced into the animals' world. Color now becomes the main theme of the story sequence. Each animal is allowed to choose the color that he wants to be. Pat then paints all the animals.

Pat next assumes the role of teacher. He asks each animal to think of objects which are of his chosen color. The children have an opportunity to discuss each new picture at length, and to classify objects according to their colors. They discover that colors can be mixed to make new colors, and they learn to identify light and dark shades of the same color.

In addition to black, white, red, and green, which were the initial colors introduced, the children learn to recognize and name the following colors: blue, yellow, tan, orange, purple, lavender, pink, and brown.

The Letters of the Alphabet

The concept of a letter is introduced. Pat uses the pieces of a broken red square to make the letter a. He then presents the letters b, c, and d. As the animals take the letters apart and play with them, the children discover the distinctive shape of each letter. At the end of the book, Pat gives the children an early insight into the function of letters by printing the word dad.

In Book 2, the students learn that the set of letters used in English is called the alphabet, and that each letter has its own placed in an ordered sequence. The children then learn the names of all the letters of the alphabet. An alphabet chart for the small letters is introduced in Lesson 16 of Book 1. It is used along with Book 2 for frequent drills, reviews, and exercises.

In addition to their work with letter identification and alphabetical order, the students learn how to spell by naming the letters which a word contains. These spelling exercises do not require a student to be able to read words, but they help to prepare him for future work in reading and spelling by establishing the following concepts:

1. Words are made up of letters.
2. Spaces are left between words.
3. We spell by naming the letters that a word contains.
4. We always start by naming the first letter on the left.
5. We name all the letters in a left-to-right sequence.

The principal characters from Book 1 reappear in Book 2. Pat reviews the letters a, b, c, and d for the lion and the tiger. He then teaches them the letters e through i, and gives them a series of spelling lessons. The story of the lion's trip through Alphabet Land introduces the letters k through z. Each letter represents a separate adventure. The lion's experiences with the letter help to fix its name and shape clearly in the students' mind.

In Book 3, the students learn to recognize and name each capital letter. They discover that the capital letters have the same names as the corresponding small letters, and that they occur in the same places in the alphabet. An alphabet chart for the capital letters is introduced early in the book. Like the small letter chart, it is then used constantly for drills, reviews, and other exercises.

The students learn that the names of people, pets, and places begin with capital letters. They immediately apply this knowledge to the spelling of proper names. The spelling exercises teach the students to see each printed word as a unit, while giving them further practice in naming both small and capital letters.

In addition to their work with letter identification and spelling, the students become familiar with the concept of rhyme. They learn that words which end in the same letters also end in the same sounds. They discover that such words are said to "rhyme" with each other. Using this information, the children practice matching pairs of rhyming words. Of course, this type of exercise establishes a basic understanding of the concept of rhyme, but its real objective is to prepare the student for reading by accustoming him to thinking in terms of the sounds of letters. As the student begins to relate sounds to letters, he gains initial insight into letter-sound relationships. He is preparing, step by step, for his later work in reading.

After a brief review of the previously learned concepts, Book 4 introduces the sounds of the letters, and the students begin to read. The students learn that letters have sounds as well as names. The letter a is assigned to sound /ae/, as in apple. This relationship between a speech-sound and the letter which represents it is called a "sound-symbol relationship."

From the beginning, the students distinguish carefully between the sound of a letter and its name. A series of listening exercises trains them to relate the sounds of letters to spoken words, and to decide whether various groups of words being with the same sound or with different sounds. After the students learn the sound of the letter *a*, they learn the sounds of *n* and *p*. Then they put the known sounds together to read the words *nap* and *pan*.

As we have seen, the children already know how to spell words by saying the *names* of their letters. They now learn that they can read words by saying the *sounds* of their letters. Here the extensive earlier practice in naming letters from left to right proves invaluable. It is now an easy step from spelling words by saying the names of their letters to reading words by saying the sounds of the letters.

Nine sound-symbol relationships and 33 three-letter words are taught in Book 4. The students learn to read proper names and adjective-noun phrases such as *ten men*. Each of the 33 words is read, spelled, and reviewed dozens of times.

In Book 5, the students learn six new sound-symbol relationships. The reading and spelling vocabulary is expanded to a total of 70 words. Of these words, only the indefinite article *a* is irregular. The students learn that when used as a word by itself (*a* pin), the letter *a* has the sound of /a/. Within a word, it retains the sound /ae/ as in m*a*n. The indefinite article is immediately used to form article-noun phrases which are then expanded to article-adjective-noun phrases. By the end of Book 5, the students have had extensive practice in reading many types of phrases and sentences.

In Book 6, the students learn four new sound-symbol relationships and 54 new words, including 17 proper names. After each new word has been contrasted with vocabulary items that were learned previously, the students use it to generate phrases and sentences. When they have become skilled at reading for phrasal and sentence meaning, the children read two simple "stories" in which the sentences narrate a series of related events.

From the beginning, the students have read for meaning. There has been an unambiguous one-to-one relationship between each picture and the accompanying word, phrase, or sentence. Each noun has had a clearly-pictured referent, the action of each verb has been operationally defined, and every relationship between objects has been clearly stated in pictorial terms. At the end of Book 6, the students are able to generalize confidently to new sound-symbol relationships, new words, and new structural patterns. They are now prepared for meaningful, enjoyable reading.

The Sullivan Enrichment Supplement

Level II of the experimental program involved two Head Start teachers in using the *Sullivan Enrichment Supplement* (Behavioral Research Laboratories) in conjunction with the Buchanan material for thirty minutes on a daily basis. A description of the materials used for the supplement is as follows: a box of enrichment materials containing the following items--a teacher's manual, three series of colorbooks for each child, ninety full-color enrichment cards for discussion, one set of letter cards and three sets of word cards. The teacher's manual explicitly describes the manner in which each item is to be used, what concepts of the Buchanan Program are to be expanded in the use of the enrichment materials, the amount of specific direction to be given to the child, and when the child is permitted freedom in his use of the enrichment material. The supplement items are to further encourage the development of verbal-language skills, and provide the teacher with opportunities to assess the educational progress of each child. The Sullivan Enrichment Supplement is sequentially presented as the initial concepts of reading readiness are absorbed by the child.

The ninety full-color enrichment cards begin with Book I and provide an opportunity for further discussion of the traits of the characters and concepts presented in the six Big Books. They are designed not only to enhance the children's knowledge of animals, people, places, but give each child an opportunity to tell his own story about things in his environment that may relate to the concepts of the lesson. The presentation of the enrichment cards afford opportunities for oral problem-solving in the discussion.

The colorbooks give each student an opportunity to make active use of the color discrimination which he has learned to make. Like Pat in Big Book I, the children select the appropriate color for each of their animal friends, and they color objects to match those in the Big Books. Thus the colorbooks reinforce each child's recently learned skills.

The colorbooks begin after Lesson 9 of Readiness Book I and continue throughout Readiness Book III. They are used daily in conjunction with the enrichment cards with the number of pages assigned (at the discretion of the teacher).

The implementation of letter cards begins with Book II to review after each lesson the alphabet letters that have been introduced. The letter cards are exercises arranged in order of increasing difficulty with references to the alphabet chart. The letter cards can be used throughout the course of six Readiness Books, to test the student's ability to identify the lower case and capital letters. Many imaginative "games" may be used to vary the exercises.

The supplement is designed to use word cards with Book IV, V, and VI. There is a set of cards for each of the three books. On the front of each card, a word is associated with a picture. On the back of the card, the same word appears by itself. The word cards are used to review the vocabulary which has already been presented in the Readiness Books. The word cards are to be used as supplementary aids for reviewing the information presented in each lesson, not as a means of testing the students' reading ability. However, spelling-bees are a means of varying their use for the teacher and student.

The Swanson Supplement

The Swanson Supplement was developed primarily for use as enrichment and as a supplementary program to the Buchanan Language Readiness Program from Behavioral Research Laboratories. The Swanson Supplement reinforces concepts initially presented in the Buchanan material; at the same time, the supplement focuses on numerous other readiness skills and fundamental concepts, which children usually acquire before beginning first grade.

Basic readiness skills were identified, were broken down into their more basic perceptual-motor components, and were placed along a developmental continuum. Activities were designed and arranged in tightly prescribed sequences for each of the skill areas focused upon. These activities were started at the lowest levels and were worked sequentially upward through more complex, higher-level skills which culminated in paper and pencil activities which required a rather high degree of concentration from each child. Materials were presented from concrete to more abstract levels of thinking and from simple to more complex learning. Positive reinforcement was "built into" the program to a large extent as each child experienced success at the different levels of activity in that the tasks he was asked to perform were normally within his command due to the graduated increase in difficulty level of the materials.

The Swanson Supplement focused on the following skills:

1) Development of Body Image; Body Movement Skills
2) Visual Discrimination

3) Figure-Ground Perception
4) Visual-Motor Perception
5) Form Perception
6) Spatial Relationships
7) Auditory Perception
8) Oral Language Skills

A child's activities included tasks such as: identification of body parts, fitting together simple puzzles, drawing lines, circles, and other forms, sorting objects according to color and shape, matching patterns in pictures, listening activities, stringing beads according to patterns, reproducing pegboard patterns, relating the body to other objects, performing drawing activities, body movement activities, and so on. At the higher sequential levels, paper and pencil activities were utilized, including original worksheets designed specifically for the program.

Activities and materials used to develop skill in each of the areas listed above were designed with the special characteristics of young children in mind. An attempt was made to integrate social, emotional, physical, and mental aspects of growth, development, and behavior of young children with some of the principles of learning which are thought to enhance the teaching-learning process.

The Swanson Supplement was used by 6 teachers in the experimental program, on a daily basis for thirty minutes following the presentation of the Buchanan Program. Each lesson was arranged to include several activities relating to the 8 areas of developmental skills desired by the author, with repetition a significant factor.

Reinstein Reinforcement Program

The reinforcement treatment program was developed by Barry Reinstein, at the University of South Carolina, and has as its general function the reinforcement of concepts presented during the daily reading intervention program. The general purposes of the schedule are:

1. To provide opportunity for review of specific tasks presented in daily lessons.
2. To measure the child's ability to obey simple commands.
3. To strengthen and improve the child's motor coordination.
4. To assess the effect, if any, of a success-reward, failure-nonreward situation on the child's ability to learn and retain concepts presented earlier in the day's activities.

Each daily lesson has an accompanying set of reinforcement sheets. There are three of these per lesson, and the sheets are arranged in descending order: 3-2-1 from most difficult to easiest. All children are presented sheet #3. At the outset, the task is either completed or not by the child. Should he complete the task correctly, he is then given a piece of candy. In addition, he is allowed to choose his activity for the succeeding 20 minutes from a list of 4 different activities. Every fourth success is reinforced with both candy and a small toy in addition. Should the child fail with picture #3, the reason for his failure is explained, and he is then presented with picture #2. Finally should he fail with picture 2, he is given picture #1, the easiest of the three. If he fails to complete the task correctly after 3 attempts, he does not receive candy, nor does he have the opportunity for free choice of activity for the day. Hopefully, then the relationship between success or successful completion of task and reward versus failure to complete the task demanded and nonreward will be established.

Teacher Innovated Supplement

The intervention plan required teachers in Experimental Group 1 to administer the orthodox Buchanan Language Program and a teacher innovated supplement as suggested by the Buchanan manual. The time sequence was 30 minutes for the Buchanan Program, a 20 minute break, followed by 30 minutes of instruction with the teacher innovated supplement. Two Head Start teachers in the Austin Public School System were trained for Experimental Group 1.

The following is an illustrative list of teacher innovated activities used throughout the intervention program as submitted by the teachers:

"How Do You Do" (story telling left from right)
Rolling a ball and a block
Draw, color, and cut out shapes

Drawing something green, red, black

Old King Cole (story - left and right sequencing)

Children tell page number on each page

Painting using only the colors Pat is wearing

Paint a Big Book animal friend

Paint circles with two colors to make a new one

Cutting and tearing letters

Rhyming words using Instructor Kit and imagination

Ooo-Loo, the Kangaroo (story on color and rhyme)

Small letters in our names

Fun with words (Kindergraph Kit)

Dramatization

Field Trip follow-ups in sequence

Listing objects in our room on board, and pupils spell

ABC Lotto

"There was an Old Woman" (story on names and shapes of letters)

Spelling our names and addresses

Sounds around our room (letters) THINK

Draw rings around letters as they are called out

Visual discrimination with pictures and letters

Pick a word from can, and read

Pictures: spell names by sound

Pick out beginning sounds of picture

Alphabet poster cards

Filling in blanks on board

Training of the Teachers

The general design of the research required that the teachers of the experimental Head Start classes should vary systematically in the amounts of formal training they received for specific participation in the curricular intervention. Accordingly, some brief description is provided in this section of the kinds and amounts of training provided to the teachers before the intervention was initiated. Some teachers were minimally "trained" locally, while others, as required by the research design, were more thoroughly trained for either a two-week or a three-week period at the University of South Carolina. The nature of the "local teacher training" will be indicated below in the description of the various experimental groups.

Training at the University of South Carolina

Four teachers from the Austin (Texas) Independent School District's Head Start Program and two teachers from Del Valle, Texas, Head Start Program participated in a formal and intensive training program as outlined in the research proposal. The teachers were required to spend two to three weeks in formal training under the direction of staff members at the University of South Carolina. The training sessions were held prior to the teacher's beginning the use of the packaged materials in the Head Start classrooms (October, 1968). Two weeks training was required for some experimental teacher groups and three weeks training for the experimental groups using the reinforcement part of the intervention program.

The techniques used for the training of the teachers consisted of:

1) general discussion of the purpose of the intervention program
2) philosophy and goals of the packaged programs to be used
3) required practice teaching and role playing
4) reading of the manuals
5) evaluation of every teacher's strength and weaknesses during the required practice teaching sessions. The Austin Head Start teachers were not eliminated on the basis of competition as only the required number of teachers attending the training session were included.

Two monitors from The University of Texas Evaluation and Research Center also participated in the training sessions by observation of the teachers and filling out the required monitor forms.

General Design of the Research

The research was designed to investigate the effect of the various levels of teacher training, and the curricular materials used, upon the general cognitive, intellectual, and language development of the children. Experimental groups were established on the bases of: (a) amount of formal teacher training with the specific readiness materials to be used in the intervention program, (b) on the kind and amount of supplementary materials used in conjunction with the basic reading intervention program; and (c) amount of teacher training for the program. In addition, since the principal emphasis of the intervention was to be in the area of English language development, replications were established based upon the primary language experience (English or Spanish) of the children, previous to their entry into Head Start.

The diagram below presents the general design of the research in schematic fashion.

	Experimental Groups					Control Groups	
	1	2	3	4	5	1	2
Replication I (English)	11	15	15	14	13	13	14
Replication II (Spanish)	15	13	12	13	13	9	▨

Fig. 1. Schematic Diagram of General Research Design.
N's in cells are posttest N's.

Each cell in Figure 1 corresponds to one Head Start class. Thus, in summary, teachers of Experimental Groups 1, 2, 3, 4, and 5 differed in terms of (a) formal _vs._ informal training and (b) the amount and kind of supplementary curricular materials used and experiences supplied. The N's shown in the cells are the posttest N's.

Neither of the teachers of Experimental Group 1 received formal training at the University of South Carolina; they did, however, receive a half-day of training locally before using the Sullivan-Buchanan curricular materials in the classroom. Both of the teachers of Experimental Group 2 were given a half-day of training locally in the use of the basic _Sullivan-Buchanan Readiness Program_ and the _Sullivan Enrichment_

Supplement. These curricular components have already been described. The teachers of Experimental Group 3 were trained locally (one-half day), and they used the Swanson Supplement described earlier. The teachers of Experimental Group 4 were given two weeks of formal training at the University of South Carolina in the use of the basic readiness program and the Swanson Supplement. The teachers of Experimental Group 5 were trained just as were the teachers of Experimental Group 4, but were given an additional week of formal training (at the University of South Carolina) in the use of the Reinstein Reinforcement Program.

Measuring the Dependent Variables

In this experiment, the basic question required that we ascertain the extent to which there were significant differences in the children between pretests and posttests on certain instruments selected to assess changes in English language competence. This section describes those instruments and the variables they are purported to measure.

The Gates-MacGinitie Reading Tests: Readiness Skills

These tests are based upon a national standardization with communities selected on the basis of geographic areas, size, socioeconomic levels, etc. The test consists of eight subtests:

1. Listening Comprehension. This subtest measures the child's ability to understand the total thought of a simple story.
2. Auditory Discrimination. This test measures the child's ability to distinguish between two words of similar sound.

3. Visual Discrimination. This test measures the ability to distinguish between the printed forms of two words.
4. Following Directions. A test of the ability to follow directions which increase in complexity as the text proceeds.
5. Letter Recognition. The recognition of the letters of the alphabet.
6. Visual-motor Coordination. Measures the child's skill in completing printed letters.
7. Auditory Blending. The ability to join the parts of a word presented orally into a total word.
8. Word Recognition. Test of the ability to recognize whole words when presented in isolation.

The scores obtained from each subtest are in the form of raw scores. By the use of tables provided in the manual, these raw scores are transformed into stanines (range 1 through 9), with a mean of 5. Each stanine covers one-half of a standard deviation. Through an analysis of the standardization data, the authors have assigned weights to each subtest so as to maximize the predictive value of a Total Weighted Score for later reading achievement. With the help of additional tables provided, the Total Weighted Score can be transformed into Readiness Standard Scores (Mean = 50 and S.D. = 10) and Readiness Percentile Scores.

Metropolitan Readiness Test

The Metropolitan Readiness Test was designed to measure the extent to which school beginners have developed the several skills and abilities which constitute total readiness for first grade instruction.

1. Word Meaning. This is a picture vocabulary test.
2. Listening. Tests the ability to comprehend phrases and sentences.
3. Matching. Test of visual perception involving the recognition of similarities.
4. Alphabet. Tests the ability to recognize lower-case letters of the alphabet.
5. Numbers. Tests the knowledge of numbers.
6. Copying. A test of visual perception and motor control.

The Total Subtest Score may be transformed to provide the following derived scores: Letter Ratings, Percentile Rank, and a Stanine Score.

Illinois Test of Psycholinguistic Abilities (ITPA)

This test, administered individually, was developed on the basis of Osgood's principles concerning the communication process. The revised edition, as well as the original form, was conceived as a diagnostic rather than a classification tool. It is designed to delineate specific abilities and disabilities in children in order that remedial work might be undertaken where needed. The psycholinguistic model upon which the ITPA is based attempts to relate those functions whereby the intentions of one individual are transmitted (verbally or nonverbally) to another individual; and, reciprocally, those functions whereby the environment of the intentions of another individual are received and interpreted.

The ITPA is comprised of 12 subtests.

1. Auditory Reception (Auditory Decoding). Assesses the ability to derive meaning from material presented verbally.
2. Visual Reception (Visual Decoding). Similar to Auditory Reception but utilizing a different sense modality.
3. Visual Sequential Memory. This test assesses the child's ability to reproduce sequences of nonmeaningful figures from memory.
4. Auditory Association. This test taps the ability to relate concepts presented orally.
5. Auditory Sequential Memory. This test assesses the ability to reproduce sequences of digits increasing in length from two to eight from memory.
6. Visual Association. Taps the ability to associate concepts presented visually.
7. Visual Closure. This test assesses the child's ability to identify a common object from an incomplete visual presentation.
8. Verbal Expression. The purpose of this test is to assess the child's ability to verbalize his own concepts.
9. Grammatic Closure. This test assesses the child's ability to make use of the redundancies of the oral language in acquiring automatic habits for handling syntax and grammatical inflection.

10. *Manual Expression.* This test taps the child's ability to express ideas manually.
11. *Auditory Closure.* This is a test of the organizing process at the automatic level. It involves the ability to provide the missing parts which are deleted in auditory presentation and to produce a complete word.
12. *Sound Blending.* This test taps the organizing process in the auditory-vocal channel.

The raw scores obtained from the test are transformed into a Psycholinguistic Age (PLA) for each subtest, Scaled Scores for each subtest and a Composite Psycholinguistic Age. All these derived scores are obtained from norms using the subject's age. The Psycholinguistic Age Score can be interpreted in a way similar to the Mental Age provided by the Stanford-Binet.

Preschool Inventory

This instrument, (Experimental Edition, 1968) developed by Bettye M. Caldwell, consists of 64 items which assess the child's familiarity with concepts and tasks relevant to the preschool experience. The total number of items answered correctly becomes the basis of the test score.

Animal House (A Subtest of the WPPSI)

This subtest involves the recognition of colors of animals, and finally the ability to follow directions. The score on this particular subtest is derived from a table which takes into account: time, number of errors, and number of correct items.

Stanford-Binet Intelligence Scale (Form L-M)

This widely known instrument was administered individually. Mental Age and IQ are obtained from the tables in the manual.

Comparability of Groups at Pretest

The first type of data analysis was done on the beginning performance of the Head Starters on the Stanford-Binet, Animal House, Preschool Inventory, Metropolitan, Gates-MacGinitie, and Illinois Test of Psycholinguistic Ability. This was done by a series of single classification analyses of variance. The question at issue was the comparability of the groups. The groupings of the Head Starters were:

A. Five Experimentals of English language background

B. Five Experimentals of Spanish language background

C. Three Controls of varying language background

All Experimentals were taught with the Buchanan materials, but the amounts of teacher training and the kinds of supplemental meterials were varied. The above groupings of Experimentals were divided as follows:

Group 1 - no formal teacher training, a teacher provided supplement

Group 2 - no formal teacher training, the Buchanan Supplement

Group 3 - no formal teacher training, the Swanson Supplement

Group 4 - formal teacher training, the Swanson Supplement

Group 5 - formal teacher training, the Swanson Supplement and Reinforcement

All Controls were taught with a teacher devised curriculum, but one group was monitored and they were of varied language background. The Controls were divided as follows:

Group 1 - English language background, monitored

Group 2 - English language background, unmonitored

Group 3 - Spanish language background, unmonitored

Table 1 indicates that the English Experimental Groups were significantly different groups on the following variables:

- Animal House
  - Total Raw Score
- Preschool Inventory
  - Total Right
- Metropolitan
  - Alphabet
  - Numbers
  - Copying
  - Total Subtest Score
- Gates-MacGinitie
  - Auditory Discrimination
  - Visual Discrimination
  - Following Directions
  - Letter Recognition
  - Visual-motor Coordination
  - Auditory Blending

TABLE 1

Single Classification Analysis of Variance for the English Experimentals on the Various Measures at Pretesting

	English 1		English 2		English 3		English 4		English 5		
Measures	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	F
Stanford-Binet											
Chronological Age	11	62.82	15	68.47	15	67.00	14	68.71	13	64.15	
Mental Age	11	55.82	15	58.27	15	60.20	14	65.57	13	58.92	
IQ	11	87.36	15	83.53	15	88.87	14	95.07	13	91.00	1.46
Animal House											
Total Raw Score	11	24.55	13	34.85	15	38.60	14	47.07	13	31.31	5.82***
Preschool Inventory											
Total Right	11	36.45	13	43.77	15	47.00	14	49.21	13	40.23	3.32*
Metropolitan											
Word Meaning	11	6.09	15	6.07	15	5.40	14	6.71	13	5.23	1.93
Listening	11	7.27	15	9.13	15	8.47	14	9.93	13	8.77	2.13
Matching	11	4.82	15	6.13	15	5.87	14	7.00	13	4.92	1.95
Alphabet	11	4.00	15	6.67	15	10.67	14	10.00	13	7.00	8.43***
Numbers	11	6.18	15	8.00	15	9.00	14	10.50	13	6.92	3.28*
Copying	11	1.82	15	2.67	15	4.60	14	6.79	13	2.31	4.95**
Total Subtest Score	11	30.27	15	38.67	15	43.40	14	50.93	13	35.15	6.78***

TABLE 1 (Continued)

Measures	English 1 N	English 1 Mean	English 2 N	English 2 Mean	English 3 N	English 3 Mean	English 4 N	English 4 Mean	English 5 N	English 5 Mean	F
Gates-MacGinitie											
Listening Comprehension	11	8.73	14	9.93	15	11.07	13	10.46	13	10.62	1.37
Auditory Discrimination	11	14.55	14	14.79	15	17.20	13	18.00	13	14.31	3.03*
Visual Discrimination	11	8.00	14	10.86	15	13.47	13	12.62	13	7.85	3.75**
Following Directions	11	5.36	13	5.31	15	7.27	13	9.08	13	6.23	4.01**
Letter Recognition	11	4.64	13	8.38	15	12.27	13	11.46	13	7.08	7.81***
Visual-motor Coordination	11	3.00	13	4.54	15	11.40	13	10.38	13	6.23	9.13***
Auditory Blending	11	5.18	13	6.15	15	7.27	13	8.00	13	5.15	4.18**
Word Recognition	11	6.73	13	9.00	15	9.60	13	8.85	13	7.85	2.91*
Total Weighted Score	11	37.27	13	44.31	15	56.27	13	60.00	13	41.62	8.89***
ITPA											
Sum of Raw Scores	11	135.18	14	155.29	15	171.80	14	176.29	13	149.62	2.47
Auditory Reception	11	14.91	14	15.14	15	17.47	14	18.79	13	16.15	.97
Visual Reception	11	8.82	14	12.79	15	14.40	14	13.29	13	10.92	1.73
Visual Sequential Memory	11	11.09	14	13.00	15	15.00	14	15.93	13	15.00	2.36
Auditory Association	11	12.45	14	13.50	15	15.27	14	17.29	13	13.08	1.70
Auditory Sequential Memory	11	19.36	14	18.43	15	25.60	14	20.14	13	18.31	1.81
Visual Association	11	11.91	14	14.00	15	15.27	14	17.79	13	14.85	1.86
Visual Closure	11	14.55	14	18.57	15	18.40	14	17.57	13	15.46	1.68
Verbal Expression	11	14.91	14	17.21	15	19.07	14	16.64	13	17.08	.64
Grammatic Closure	11	8.09	14	10.00	15	9.60	14	14.43	13	8.00	4.89**
Manual Expression	11	19.09	14	22.64	15	21.73	14	25.14	13	20.77	2.74*

* $p < .05$
** $p < .01$
*** $p < .001$

- Word Recognition
- Total Weighted Score

Illinois Test of Psycholinguistic Ability

- Grammatic Closure
- Manual Expression

Table 2 indicates that the Spanish Experimental Groups were significantly different groups on the following variables:

Stanford-Binet

- IQ

Metropolitan

- Listening
- Matching
- Total Subtest Score

Gates-MacGinitie

- Listening Comprehension
- Auditory Discrimination
- Visual Discrimination
- Following Directions
- Visual-motor Coordination
- Auditory Blending
- Total Weighted Score

Illinois Test of Psycholinguistic Ability

- Manual Expression

TABLE 2

Single Classification Analysis of Variance for the

Spanish Experimentals on the Various

Measures at Pretesting

Measures	Spanish 1 N	Spanish 1 Mean	Spanish 2 N	Spanish 2 Mean	Spanish 3 N	Spanish 3 Mean	Spanish 4 N	Spanish 4 Mean	Spanish 5 N	Spanish 5 Mean	F
Stanford-Binet											
Chronological Age	15	67.07	13	69.08	12	66.08	13	68.69	13	66.31	
Mental Age	15	57.20	13	53.92	12	58.25	13	58.85	13	60.69	
IQ	15	84.00	13	75.77	12	86.33	13	84.31	13	91.23	2.56*
Animal House											
Total Raw Score	15	36.13	13	39.23	12	40.83	13	44.15	13	37.54	.77
Preschool Inventory											
Total Right	15	35.00	13	33.38	12	35.67	13	40.77	13	42.00	1.75
Metropolitan											
Word Meaning	15	5.53	12	5.00	11	5.82	13	5.08	13	6.31	1.00
Listening	15	7.47	12	9.42	11	9.55	13	8.77	13	9.54	2.79*
Matching	15	4.67	12	6.92	11	6.09	13	7.23	13	6.77	3.08*
Alphabet	15	6.07	12	6.83	11	8.73	13	9.23	13	8.85	1.75
Numbers	15	6.80	12	8.50	11	8.82	13	8.62	13	9.85	1.60
Copying	15	2.53	12	4.25	11	5.91	13	4.85	13	4.85	2.32
Total Subtest Score	15	33.07	12	40.92	11	44.91	13	43.69	13	46.15	3.67**

TABLE 2 (Continued)

Measures	Spanish 1 N	Spanish 1 Mean	Spanish 2 N	Spanish 2 Mean	Spanish 3 N	Spanish 3 Mean	Spanish 4 N	Spanish 4 Mean	Spanish 5 N	Spanish 5 Mean	F
Gates-MacGinitie											
Listening Comprehension	15	8.33	13	9.69	10	11.30	13	9.69	13	11.54	2.68*
Auditory Discrimination	15	14.13	13	12.46	10	17.70	13	15.62	13	16.62	4.33**
Visual Discrimination	15	7.53	13	9.00	10	11.00	13	8.77	13	11.92	3.68**
Following Directions	15	5.07	13	5.46	10	6.50	13	6.08	13	8.85	3.76**
Letter Recognition	15	6.73	13	8.62	10	10.30	13	9.08	13	10.62	2.12
Visual-motor Coordination	15	6.13	13	8.00	10	12.60	13	9.31	13	8.92	3.83**
Auditory Blending	15	7.87	13	6.08	10	9.20	13	6.69	13	8.38	2.60*
Word Recognition	15	7.67	13	8.62	10	8.50	13	8.31	13	9.23	.76
Total Weighted Score	15	41.07	13	42.85	10	55.50	13	47.15	13	55.31	5.79***
ITPA											
Sum of Raw Scores	15	135.60	13	143.92	12	152.25	13	147.23	13	156.62	1.05
Auditory Reception	15	14.53	13	13.15	12	16.17	13	13.54	13	16.23	1.11
Visual Reception	15	11.20	13	12.31	12	15.08	13	14.00	13	11.92	1.51
Visual Sequential Memory	15	14.80	13	15.15	12	15.25	13	16.46	13	15.38	.35
Auditory Association	15	10.40	13	10.00	12	11.83	13	12.31	13	13.15	.89
Auditory Sequential Memory	15	13.20	13	14.62	12	17.58	13	17.54	13	15.62	.92
Visual Association	15	15.00	13	15.00	12	15.92	13	14.69	13	14.54	.12
Visual Closure	15	15.87	13	18.00	12	18.58	13	16.23	13	17.46	1.35
Verbal Expression	15	13.87	13	16.85	12	15.67	13	15.08	13	18.38	1.11
Grammatic Closure	15	6.20	13	6.23	12	7.00	13	6.54	13	8.62	.70
Manual Expression	15	20.53	13	22.62	12	19.17	13	20.08	13	26.08	3.27*

* $p < .05$
** $p < .01$
*** $p < .001$

Table 3 indicates that the Control Groups were significantly different groups on the following variables:

- Stanford-Binet
    - IQ
- Preschool Inventory
    - Total Right
- Illinois Test of Psycholinguistic Ability
    - Sum of Raw Scores
    - Auditory Reception
    - Grammatic Closure

A fair interpretation of Tables 1, 2 and 3 seems to be that the Control Groups were a much more homogenous population (especially on the Reading Readiness Tests) than were the English and Spanish Experimental Groups.

Table 4 presents an analysis comparing beginning performance in which the following three groups are compared:

- All English Speaking Experimentals
- All Spanish Speaking Experimentals
- All Controls

The groups are compared on the same variables as in Tables 1, 2 and 3. Table 4 indicates that these groups differ at pretesting significantly on the following variables:

- Preschool Inventory
    - Total Right

TABLE 3

Single Classification Analysis of Variance for the Control Groups on the Various Measures at Pretesting

Measures	English Control Monitored N	English Control Monitored Mean	English Control Unmonitored N	English Control Unmonitored Mean	Spanish Control Unmonitored N	Spanish Control Unmonitored Mean	F
Stanford-Binet							
Chronological Age	13	67.15	14	68.14	9	68.44	
Mental Age	13	61.62	14	60.00	9	55.67	
IQ	13	91.77	14	86.71	9	79.44	4.57*
Animal House							
Total Raw Score	13	41.38	14	28.29	9	40.00	3.25
Preschool Inventory							
Total Right	13	49.85	14	44.00	9	37.22	7.03**
Metropolitan							
Word Meaning	13	5.15	14	5.50	9	5.44	.12
Listening	13	9.23	14	8.14	9	8.44	1.07
Matching	13	5.31	14	5.43	9	4.78	.39
Alphabet	13	5.69	14	4.29	9	4.11	1.27
Numbers	13	9.62	14	7.21	9	7.11	1.95
Copying	13	2.31	14	3.14	9	2.33	.44
Total Subtest Score	13	37.31	14	33.71	9	32.22	.71

TABLE 3 (Continued)

Measures	English Control Monitored N	English Control Monitored Mean	English Control Unmonitored N	English Control Unmonitored Mean	Spanish Control Unmonitored N	Spanish Control Unmonitored Mean	F
Gates-MacGinitie							
Listening Comprehension	13	9.85	14	10.36	9	7.89	2.63
Auditory Discrimination	13	15.38	14	14.07	9	13.44	1.16
Visual Discrimination	13	9.54	14	9.50	9	8.11	.44
Following Directions	13	8.54	14	6.00	9	5.11	3.18
Letter Recognition	13	6.62	14	4.86	9	4.56	1.53
Visual-motor Coordination	13	7.62	14	7.07	9	7.22	.05
Auditory Blending	13	6.00	14	6.79	9	6.00	.44
Word Recognition	13	9.62	14	8.93	9	8.44	.35
Total Weighted Score	13	46.38	14	40.57	9	37.78	1.98
ITPA							
Sum of Raw Scores	13	170.62	14	157.79	9	138.56	3.43*
Auditory Reception	13	19.85	14	17.00	9	13.22	4.34*
Visual Reception	13	15.23	14	15.00	9	14.33	.14
Visual Sequential Memory	13	12.46	14	13.14	9	12.78	.11
Auditory Association	13	15.23	14	13.86	9	11.89	1.90
Auditory Sequential Memory	13	19.23	14	17.86	9	17.67	.24
Visual Association	13	16.46	14	16.79	9	14.89	.55
Visual Closure	13	17.08	14	16.50	9	15.44	.36
Verbal Expression	13	21.92	14	19.00	9	15.22	2.86
Grammatic Closure	13	11.92	14	8.79	9	7.33	5.71**
Manual Expression	13	21.23	14	19.86	9	15.78	2.74

* $p < .05$
** $p < .01$

TABLE 4

Single Classification Analysis of Variance for the Experimental and Control Groups on the Various Measures at Pretesting

Measures	English Speaking Experimentals		Spanish Speaking Experimentals		Control Groups		
	N	Mean	N	Mean	N	Mean	F
Stanford-Binet							
Chronological Age	68	66.46	66	67.45	36	67.86	
Mental Age	68	59.93	66	57.76	36	59.50	
IQ	68	89.13	66	84.29	36	86.72	2.40
Animal House							
Total Raw Score	66	35.88	66	39.45	36	35.94	1.30
Preschool Inventory							
Total Right	66	43.74	66	37.32	36	44.42	8.41***
Metropolitan							
Word Meaning	68	5.90	64	5.55	36	5.36	1.21
Listening	68	8.78	64	8.88	36	8.61	.16
Matching	68	5.81	64	6.28	36	5.22	2.58
Alphabet	68	7.87	64	7.88	36	4.75	9.72***
Numbers	68	8.24	64	8.45	36	8.06	.16
Copying	68	3.74	64	4.38	36	2.64	3.23*
Total Subtest Score	68	40.21	64	41.39	36	34.64	4.13*

TABLE 4 (Continued)

Measures	English Speaking Experimentals N	English Speaking Experimentals Mean	Spanish Speaking Experimentals N	Spanish Speaking Experimentals Mean	Control Groups N	Control Groups Mean	F
Gates-MacGinitie							
Listening Comprehension	66	10.23	64	10.00	36	9.56	.65
Auditory Discrimination	66	15.83	64	15.16	36	14.39	1.87
Visual Discrimination	66	10.73	64	9.52	36	9.17	1.93
Following Directions	65	6.71	64	6.34	36	6.69	.25
Letter Recognition	65	9.00	64	8.94	36	5.42	10.10***
Visual-motor Coordination	65	7.37	64	8.73	36	7.31	1.62
Auditory Blending	65	6.42	64	7.58	36	6.31	4.25*
Word Recognition	65	8.49	64	8.44	36	9.06	.71
Total Weighted Score	65	48.48	64	47.81	36	41.97	3.47*
ITPA							
Sum of Raw Scores	67	158.97	66	146.70	36	157.61	2.45
Auditory Reception	67	16.58	66	14.70	36	17.08	2.88
Visual Reception	67	12.24	66	12.82	36	14.92	3.25*
Visual Sequential Memory	67	14.13	66	15.39	36	12.81	4.77**
Auditory Association	67	14.43	66	11.50	36	13.86	5.92**
Auditory Sequential Memory	67	20.52	66	15.61	36	18.31	6.91**
Visual Association	67	14.90	66	15.02	36	16.19	.79
Visual Closure	67	17.06	66	17.17	36	16.44	.34
Verbal Expression	67	17.10	66	15.91	36	19.11	2.87
Grammatic Closure	67	10.13	66	6.89	36	9.56	9.75***
Manual Expression	67	22.01	66	21.70	36	19.33	3.00

* $p < .05$
** $p < .01$
*** $p < .001$

- Metropolitan
    - Alphabet
    - Copying
    - Total Subtest Score
- Gates-MacGinitie
    - Letter Recognition
    - Auditory Blending
    - Total Weighted Score
- Illinois Test of Psycholinguistic Ability
    - Visual Reception
    - Visual Sequential Memory
    - Auditory Association
    - Auditory Sequential Memory
    - Grammatic Closure

It is interesting to note that where significant differences occur, the groups with higher means in most cases (and in every case as to the Reading Readiness Tests) are the Experimentals. It is suggested that this may be true for the reason that the pretesting was often accomplished after considerable lapse of time from the beginning of the language intervention program. In those cases where the higher means are in favor of the English Experimentals and the Controls it is suggested that language background is probably an explanatory factor.

Basic Questions

All analyses to be reported are directed toward answering these basic questions:

1. Do different intervention treatments have differential effects among the experimental groups?
2. Are there significant differences between experimentals and controls?
3. What are the effects of Head Start generally in this population?

Results

Beginning and Final Performance

Data analysis was done on the beginning and final performance of the subjects (as previously grouped). The statistical procedure was a series of groups by trials analyses of variance. The questions posed for analysis were:

1. Are there differences between groups? (Group main effect)
2. Are there differences between trials? (Trial main effect)
3. Are there groups by trials differences? (Interaction between groups and trials) Another way of stating the question is: Are there differences in the rate of gain or loss among the groups?

Table 5 sets out the results of comparing the English Speaking Experimental classes. It indicates group differences, which are statistically significant, between these 5 treatment groups on the following variables:

- Animal House
    - Total Raw Score
- Preschool Inventory
    - Total Right
- Metropolitan
    - Word Meaning
    - Listening
    - Alphabet
    - Numbers
    - Copying
    - Total Subtest Score
- Gates-MacGinitie
    - Listening Comprehension
    - Visual Discrimination
    - Letter Recognition
    - Visual-motor Coordination
    - Auditory Blending
    - Total Weighted Score
- Illinois Test of Psycholinguistic Ability
    - Grammatic Closure

Table 5 also indicates trial differences, which are statistically

TABLE 5

Subjects by Trial Analysis of Variance for the
English Experimentals on the Various Measures
at Pre- and Posttesting

		English 1	English 2	English 3	English 4	English 5	Trial Means
				Stanford-Binet			
				Chronological Age When Tested			
	N's	11	15	15	14	13	
Post Mean		69.09	73.80	72.73	74.71	70.38	72.34
Pre Mean		62.82	68.47	67.00	68.71	64.15	66.46
Gain (or loss)		6.27	5.33	5.73	6.00	6.23	5.88
Group Means		65.95	71.13	69.87	71.71	67.27	
				Mental Age When Tested			
	N's	11	15	15	14	13	
Post Mean		61.09	64.13	68.40	72.79	66.23	66.76
Pre Mean		55.82	58.27	60.20	65.57	58.92	59.93
Gain (or loss)		5.27	5.86	8.20	7.22	7.31	6.83
Group Means		58.45	61.20	64.30	69.18	62.53	

TABLE 5 (Continued)

		English 1	English 2	English 3	English 4	English 5	Trial Means
				IQ			
	N's	11	15	15	14	13	
Post Mean		87.45	85.40	93.60	97.00	93.46	91.47
Pre Mean		87.36	83.53	88.87	95.07	91.00	89.13
Gain (or loss)		.09	1.87	4.73	1.93	2.46	2.34*
Group Means		87.41	84.47	91.23	96.04	92.23	
				Animal House Total Raw Score			
	N's	10	13	15	14	13	
Post Mean		40.40	37.62	46.73	54.14	50.23	46.23
Pre Mean		26.10	34.85	38.60	47.07	31.31	36.29
Gain (or loss)		14.30***	2.77***	8.13***	7.07***	18.92***	9.94***
Group Means		33.25**	36.23**	42.67**	50.61**	40.77**	
				Preschool Inventory Total Right			
	N's	10	13	15	14	13	
Post Mean		44.70	48.46	51.13	52.64	47.23	49.15
Pre Mean		35.80	43.77	47.00	49.21	40.23	43.75
Gain (or loss)		8.90	4.69	4.13	3.43	7.00	5.40***
Group Means		40.25*	46.12*	49.07*	50.93*	43.73	

TABLE 5 (Continued)

		English 1	English 2	English 3	English 4	English 5	Trial Means
Metropolitan							
Word Meaning							
	N's	11	14	15	12	12	
Post Mean		5.36	6.07	5.87	7.58	5.75	6.13
Pre Mean		6.09	6.14	5.40	6.75	5.25	5.91
Gain (or loss)		- .73	- .07	.47	.83	.50	.22
Group Means		5.73*	6.11*	5.63*	7.17*	5.50*	
Listening							
	N's	11	14	15	12	12	
Post Mean		6.45	6.71	8.47	8.58	7.25	7.53
Pre Mean		7.27	9.36	8.47	9.92	9.00	8.83
Gain (or loss)		- .82	- 2.65	0.00	- 1.34	- 1.75	- 1.30***
Group Means		6.86*	8.04*	8.47*	9.25*	8.13*	
Matching							
	N's	11	14	15	12	12	
Post Mean		6.64	6.93	8.60	7.42	5.75	7.14
Pre Mean		4.82	6.36	5.87	6.67	4.92	5.77
Gain (or loss)		1.82	.57	2.73	.75	.83	1.37***
Group Means		5.73	6.64	7.23	7.04	5.33	

TABLE 5 (Continued)

		English 1	English 2	English 3	English 4	English 5	Trial Means
				Alphabet			
	N's	11	14	15	12	12	
Post Mean		8.73	12.57	12.53	13.08	12.00	11.89
Pre Mean		4.00	6.93	10.67	10.08	6.75	7.86
Gain (or loss)		4.73	5.64	1.86	3.00	5.25	4.03***
Group Means		6.36**	9.75**	11.60**	11.58**	9.38**	
				Numbers			
	N's	11	14	15	12	12	
Post Mean		5.00	7.14	8.07	9.92	5.42	7.19
Pre Mean		6.18	8.07	9.00	9.83	6.83	8.06
Gain (or loss)		- 1.18	- .93	- .93	.09	- 1.41	- .87*
Group Means		5.59**	7.61**	8.53**	9.88**	6.13**	
				Copying			
	N's	11	14	15	12	12	
Post Mean		1.36	4.50	4.13	5.50	2.83	3.75
Pre Mean		1.82	2.86	4.60	6.75	2.33	3.72
Gain (or loss)		- .46	1.64	- .47	- 1.25	.50	.03
Group Means		1.59**	3.68**	4.37**	6.13**	2.58**	

TABLE 5 (Continued)

		English 1	English 2	English 3	English 4	English 5	Trial Means
				Total Subtest Score			
	N's	11	14	15	12	12	
Post Mean		30.82	44.07	47.67	52.08	39.00	43.19
Pre Mean		30.27	39.71	43.40	50.00	35.08	40.02
Gain (or loss)		.55	4.36	4.27	2.08	3.92	3.17**
Group Means		30.55***	41.89***	45.53***	51.04***	37.04***	
				Gates-MacGinitie			
				Listening Comprehension			
	N's	10	12	15	11	12	
Post Mean		9.90	9.08	12.87	12.09	11.00	11.10
Pre Mean		9.00	9.83	11.07	9.82	10.58	10.15
Gain (or loss)		.90	- .75	1.80	2.27	.42	.95*
Group Means		9.45*	9.46*	11.97*	10.95*	10.79*	
				Auditory Discrimination			
	N's	10	12	15	11	12	
Post Mean		16.10	16.42	17.33	17.91	16.92	16.97
Pre Mean		14.90	15.08	17.20	17.64	14.08	15.85
Gain (or loss)		1.20	1.34	.13	.27	2.84	1.12*
Group Means		15.50	15.75	17.27	17.77	15.50	

TABLE 5 (Continued)

		English 1	English 2	English 3	English 4	English 5	Trial Means
				Visual Discrimination			
	N's	10	12	15	11	12	
Post Mean		8.90	12.00	14.73	13.27	10.00	12.00
Pre Mean		7.90	11.33	13.47	11.73	7.50	10.60
Gain (or loss)		1.00	.67	1.26	1.54	2.50	1.40**
Group Means		8.40**	11.67**	14.10**	12.50**	8.75**	
				Following Directions			
	N's	10	12	15	11	12	
Post Mean		6.20	6.33	8.33	8.73	7.50	7.48
Pre Mean		5.70	5.42	7.27	8.55	6.25	6.67
Gain (or loss)		.50	.91	1.06	.18	1.25	.81**
Group Means		5.95	5.88	7.80	8.64	6.88	
				Letter Recognition			
	N's	10	12	15	11	12	
Post Mean		9.20	15.00	14.93	13.36	13.42	13.40
Pre Mean		4.90	8.67	12.27	11.00	6.42	8.92
Gain (or loss)		4.30**	6.33**	2.66**	2.36**	7.00**	4.48***
Group Means		7.05**	11.83**	13.60**	12.18**	9.92**	

TABLE 5 (Continued)

	English 1	English 2	English 3	English 4	English 5	Trial Means
			Visual-motor Coordination			
N's	10	12	15	11	12	
Post Mean	5.90	10.92	10.67	10.64	7.08	9.20
Pre Mean	3.30	4.92	11.40	9.91	6.33	7.47
Gain (or loss)	2.60**	6.00**	- .73**	.73**	.75**	1.73**
Group Means	4.60**	7.92**	11.03**	10.27**	6.71**	
			Auditory Blending			
N's	10	12	15	11	12	
Post Mean	6.60	6.75	10.53	10.55	8.17	8.65
Pre Mean	5.50	6.08	7.27	7.73	4.83	6.33
Gain (or loss)	1.10	.67	3.26	2.82	3.34	2.32***
Group Means	6.05***	6.42***	8.90***	9.14***	6.50***	
			Word Recognition			
N's	10	12	15	11	12	
Post Mean	10.00	10.08	11.33	8.55	8.67	9.82
Pre Mean	6.80	8.92	9.60	9.18	7.67	8.53
Gain (or loss)	3.20	1.16	1.73	- .63	1.00	1.29**
Group Means	8.40	9.50	10.47	8.86	8.17	

TABLE 5 (Continued)

		English 1	English 2	English 3	English 4	English 5	Trial Means
				Total Weighted Score			
	N's	10	12	15	11	12	
Post Mean		46.40	56.58	65.20	63.73	54.17	57.87
Pre Mean		38.50	45.00	56.27	57.18	40.75	48.12
Gain (or loss)		7.90	11.58	8.93	6.55	13.42	9.75***
Group Means		42.45**	50.79**	60.73**	60.45**	47.46**	
				Illinois Test of Psycholinguistic Ability			
				Sum of Raw Scores			
	N's	10	14	15	13	13	
Post Mean		167.00	173.14	192.13	203.85	183.69	184.83
Pre Mean		141.70	156.29	172.80	175.00	150.62	160.46
Gain (or loss)		25.30	16.85	19.33	28.85	33.07	24.37***
Group Means		154.35	164.71	182.47	189.42	167.15	
				Auditory Reception			
	N's	10	14	15	13	13	
Post Mean		19.80	20.00	21.13	24.62	17.38	20.63
Pre Mean		16.60	16.14	18.47	19.85	17.15	17.69
Gain (or loss)		3.20	3.86	2.66	4.77	.23	2.94***
Group Means		18.20	18.07	19.80	22.23	17.27	

TABLE 5 (Continued)

	English 1	English 2	English 3	English 4	English 5	Trial Means
Visual Reception						
N's	10	14	15	13	13	
Post Mean	14.80	16.79	18.93	20.62	17.08	17.80
Pre Mean	10.00	13.79	15.40	13.92	11.92	13.23
Gain (or loss)	4.80	3.00	3.53	6.70	5.16	4.57***
Group Means	12.40	15.29	17.17	17.27	14.50	
Visual Sequential Memory						
N's	10	14	15	13	13	
Post Mean	15.90	16.71	16.60	16.69	16.92	16.60
Pre Mean	12.40	14.00	16.00	16.77	16.00	15.17
Gain (or loss)	3.50	2.71	.60	- .08	.92	1.43**
Group Means	14.15	15.36	16.30	16.73	16.46	
Auditory Association						
N's	10	14	15	13	13	
Post Mean	18.00	16.64	18.87	21.00	17.54	18.42
Pre Mean	14.10	14.50	16.27	18.08	14.08	15.48
Gain (or loss)	3.90	2.14	2.60	2.92	3.46	2.94***
Group Means	16.05	15.57	17.57	19.54	15.81	

TABLE 5 (Continued)

	English 1	English 2	English 3	English 4	English 5	Trial Means
Auditory Sequential Memory						
N's	10	14	15	13	13	
Post Mean	21.50	20.29	25.93	21.08	24.54	22.78
Pre Mean	21.30	19.43	26.60	20.46	19.31	21.55
Gain (or loss)	.20**	.86**	- .67**	.62**	5.23**	1.23*
Group Means	21.40	19.86	26.27	20.77	21.92	
Visual Association						
N's	10	14	15	13	13	
Post Mean	16.70	18.29	18.40	21.46	21.08	19.26
Pre Mean	14.00	15.00	16.27	18.77	15.85	16.06
Gain (or loss)	2.70	3.29	2.13	2.69	5.23	3.20***
Group Means	15.35	16.64	17.33	20.12	18.46	
Visual Closure						
N's	10	14	15	13	13	
Post Mean	21.00	20.71	23.53	23.54	20.69	21.97
Pre Mean	16.10	19.57	19.40	18.54	16.46	18.17
Gain (or loss)	4.90	1.14	4.13	5.00	4.23	3.80***
Group Means	18.55	20.14	21.47	21.04	18.58	

TABLE 5 (Continued)

		English 1	English 2	English 3	English 4	English 5	Trial Means
				Verbal Expression			
	N's	10	14	15	13	13	
Post Mean		14.50	18.93	21.20	22.00	20.23	19.65
Pre Mean		16.10	18.21	20.07	17.38	18.08	18.12
Gain (or loss)		- 1.60	.72	1.13	4.62	2.15	1.53*
Group Means		15.30	18.57	20.63	19.69	19.15	
				Grammatic Closure			
	N's	10	14	15	13	13	
Post Mean		12.00	11.64	13.20	17.38	14.62	13.80
Pre Mean		9.20	11.00	10.60	14.85	9.00	11.00
Gain (or loss)		2.80*	.64*	2.60*	2.53*	5.62*	2.80***
Group Means		10.60*	11.32*	11.90*	16.12*	11.81*	
				Manual Expression			
	N's	10	14	15	13	13	
Post Mean		21.80	22.14	23.33	24.46	22.62	22.92
Pre Mean		20.90	23.64	22.73	26.15	21.77	23.14
Gain (or loss)		.90	- 1.50	.60	- 1.69	.85	- .22
Group Means		21.35	22.89	23.03	25.31	22.19	

* p < .05
** p < .01
*** p < .001

significant, on all variables except the following:

- Metropolitan
    - Word Meaning
    - Copying
- Illinois Test of Psycholinguistic Ability
    - Manual Expression

One of the primary reasons for doing this analysis was to test the hypothesis that differential treatment between Experimental Groups results in differential gains. In this regard, Table 5 indicates groups by trials differences, which are statistically significant, on the following variables:

- Animal House
    - Total Raw Score
- Gates-MacGinitie
    - Letter Recognition
    - Visual-motor Coordination
- Illinois Test of Psycholinguistic Ability
    - Auditory Sequential Memory
    - Grammatic Closure

The ordering of the group gains on the language development tests from highest to lowest, where there were significant differences, is as follows:

	Group Order
Gates-MacGinitie	
Letter Recognition	5,2,1,3,4
Visual-motor Coordination	2,1,5,4,3

	Group Order
Illinois Test of Psycholinguistic Ability	
Auditory Sequential Memory	5,2,4,1,3
Grammatic Closure	5,1,3,4,2

Table 6 sets out the results of comparing the Spanish Speaking Experimental classes. It indicates group differences, which are statistically significant, between these five treatment groups on the following variables:

- Stanford-Binet
    - IQ
- Metropolitan
    - Word Meaning
    - Listening
    - Matching
    - Alphabet
    - Copying
    - Total Subtest Score
- Gates-MacGinitie
    - Listening Comprehension
    - Auditory Discrimination
    - Visual Discrimination
    - Letter Recognition
    - Visual-motor Coordination
    - Auditory Blending
    - Total Weighted Score

TABLE 6

Subjects by Trial Analysis of Variance for the
Spanish Experimentals on the Various Measures
at Pre- and Posttesting

		Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
				Stanford-Binet			
				Chronological Age When Tested			
	N's	15	13	12	13	13	
Post Mean		72.00	74.62	71.92	74.08	73.08	73.12
Pre Mean		67.07	69.08	66.08	68.69	66.31	67.45
Gain (or loss)		4.93	5.54	5.84	5.39	6.77	5.67
Group Means		69.53	71.85	69.00	71.38	69.69	
				Mental Age When Tested			
	N's	15	13	12	13	13	
Post Mean		59.93	60.92	65.75	64.85	67.38	63.62
Pre Mean		57.20	53.92	58.25	58.85	60.69	57.76
Gain (or loss)		2.73	7.00	7.50	6.00	6.69	5.86
Group Means		58.57	57.42	62.00	61.85	64.04	

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TABLE 6 (Continued)

		Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
				IQ			
	N's	15	13	12	13	13	
Post Mean		81.27	79.77	90.25	86.23	92.00	85.70
Pre Mean		84.00	75.77	86.33	84.31	91.23	84.29
Gain (or loss)		- 2.73	4.00	3.92	1.92	.77	1.41
Group Means		82.63*	77.77*	88.29*	85.27*	91.62*	
				Animal House			
				Total Raw Score			
	N's	14	13	12	13	13	
Post Mean		42.29	44.77	45.08	43.69	46.15	44.35
Pre Mean		36.43	39.23	40.83	44.15	37.54	39.57
Gain (or loss)		5.86	5.54	4.25	- .46	8.61	4.78**
Group Means		39.36	42.00	42.96	43.92	41.85	
				Preschool Inventory			
				Total Right			
	N's	14	13	12	13	13	
Post Mean		43.57	41.15	44.42	47.08	50.92	45.42
Pre Mean		36.21	33.38	35.67	40.77	42.00	37.62
Gain (or loss)		7.36	7.77	8.75	6.31	8.92	7.80***
Group Means		39.89	37.27	40.04	43.92	46.46	

TABLE 6 (Continued)

		Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
Metropolitan							
Word Meaning							
	N's	15	12	11	13	13	
Post Mean		5.93	5.50	6.82	5.85	7.46	6.30
Pre Mean		5.53	5.00	5.82	5.08	6.31	5.55
Gain (or loss)		.40	.50	1.00	.77	1.15	.75*
Group Means		5.73	5.25	6.32	5.46	6.88	
Listening							
	N's	15	12	11	13	13	
Post Mean		6.53	6.92	8.18	7.31	7.85	7.31
Pre Mean		7.47	9.42	9.55	8.77	9.54	8.88
Gain (or loss)		- .94	- 2.50	- 1.37	- 1.46	- 1.69	- 1.57***
Group Means		7.00*	8.17*	8.86*	8.04*	8.69*	
Matching							
	N's	15	12	11	13	13	
Post Mean		7.00	6.50	8.64	8.00	9.69	7.94
Pre Mean		4.67	6.92	6.09	7.23	6.77	6.28
Gain (or loss)		2.33*	- .42*	2.55*	.77*	2.92*	1.66***
Group Means		5.83*	6.71*	7.36*	7.62*	8.23*	

TABLE 6 (Continued)

		Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
				Alphabet			
	N's	15	12	11	13	13	
Post Mean		10.00	11.33	13.91	13.23	14.69	12.53
Pre Mean		6.07	6.83	8.73	9.23	8.85	7.88
Gain (or loss)		3.93	4.50	5.18	4.00	5.84	4.65***
Group Means		8.03**	9.08**	11.32**	11.23**	11.77**	
				Numbers			
	N's	15	12	11	13	13	
Post Mean		7.33	8.67	9.55	8.23	10.69	8.83
Pre Mean		6.80	8.50	8.82	8.62	9.85	8.45
Gain (or loss)		.53	.17	.73	- .39	.84	.38
Group Means		7.07	8.58	9.18	8.42	10.27	
				Copying			
	N's	15	12	11	13	13	
Post Mean		3.73	4.33	7.00	4.77	6.15	5.11
Pre Mean		2.53	4.25	5.91	4.85	4.85	4.38
Gain (or loss)		1.20	.08	1.09	- .08	1.30	.73*
Group Means		3.13*	4.29*	6.45*	4.81*	5.50*	

TABLE 6 (Continued)

	Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
Total Subtest Score						
N's	15	12	11	13	13	
Post Mean	39.87	43.42	54.09	47.38	56.54	47.89
Pre Mean	33.07	40.92	44.91	43.69	46.15	41.39
Gain (or loss)	6.80	2.50	9.18	3.69	10.39	6.50***
Group Means	36.47***	42.17***	49.50***	45.54***	51.35***	
Gates-MacGinitie						
Listening Comprehension						
N's	15	13	10	13	13	
Post Mean	9.20	11.46	11.70	10.92	11.92	10.95
Pre Mean	8.33	9.69	11.30	9.69	11.54	10.00
Gain (or loss)	.87	1.77	.40	1.23	.38	.95*
Group Means	8.77*	10.58*	11.50*	10.31*	11.73*	
Auditory Discrimination						
N's	15	13	10	13	13	
Post Mean	15.73	15.23	17.50	17.62	17.62	16.67
Pre Mean	14.13	12.46	17.70	15.62	16.62	15.16
Gain (or loss)	1.60	2.77	- .20	2.00	1.00	1.51***
Group Means	14.93**	13.85**	17.60**	16.62**	17.12**	

TABLE 6 (Continued)

	Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
Visual Discrimination						
N's	15	13	10	13	13	
Post Mean	10.33	9.38	11.80	12.77	15.92	12.00
Pre Mean	7.53	9.00	11.00	8.77	11.92	9.52
Gain (or loss)	2.80	.38	.80	4.00	4.00	2.48***
Group Means	8.93**	9.19**	11.40**	10.77**	13.92**	
Following Directions						
N's	15	13	10	13	13	
Post Mean	6.53	6.38	6.90	7.77	7.92	7.09
Pre Mean	5.07	5.46	6.50	6.08	8.85	6.34
Gain (or loss)	1.46*	.92*	.40*	1.69*	- .93*	.75**
Group Means	5.80	5.92	6.70	6.92	8.38	
Letter Recognition						
N's	15	13	10	13	13	
Post Mean	11.33	12.00	15.80	14.46	16.69	13.89
Pre Mean	6.73	8.62	10.30	9.08	10.62	8.94
Gain (or loss)	4.60	3.38	5.50	5.38	6.07	4.95***
Group Means	9.03**	10.31**	13.05**	11.77**	13.65**	

TABLE 6 (Continued)

		Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
Visual-motor Discrimination							
	N's	15	13	10	13	13	
Post Mean		6.60	9.92	13.50	9.38	10.69	9.75
Pre Mean		6.13	8.00	12.60	9.31	8.92	8.73
Gain (or loss)		.47	1.92	.90	.07	1.77	1.02*
Group Means		6.37***	8.96***	13.05***	9.35***	9.81***	
Auditory Blending							
	N's	15	13	10	13	13	
Post Mean		9.07	7.62	11.10	10.23	11.15	9.75
Pre Mean		7.87	6.08	9.20	6.69	8.38	7.58
Gain (or loss)		1.20	1.54	1.90	3.54	2.77	2.17***
Group Means		8.47**	6.85**	10.15**	8.46**	9.77**	
Word Recognition							
	N's	15	13	10	13	13	
Post Mean		9.07	8.92	10.70	8.85	10.46	9.53
Pre Mean		7.67	8.62	8.50	8.31	9.23	8.44
Gain (or loss)		1.40	.30	2.20	.54	1.23	1.09*
Group Means		8.37	8.77	9.60	8.58	9.85	

TABLE 6 (Continued)

		Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
Total Weighted Scores							
	N's	15	13	10	13	13	
Post Mean		50.93	50.38	62.90	59.92	66.46	57.67
Pre Mean		41.07	42.85	55.50	47.15	55.31	47.81
Gain (or loss)		9.86	7.53	7.40	12.77	11.15	9.86***
Group Means		46.00***	46.62***	59.20***	53.54***	60.88***	
Illinois Test of Psycholinguistic Ability							
Sum of Raw Scores							
	N's	15	13	11	13	13	
Post Mean		157.27	166.77	180.64	169.31	182.92	170.66
Pre Mean		136.60	144.92	152.82	148.23	157.62	147.54
Gain (or loss)		20.67	21.85	27.82	21.08	25.30	23.12***
Group Means		146.93	155.85	166.73	158.77	170.27	
Auditory Reception							
	N's	15	13	11	13	13	
Post Mean		14.93	17.15	16.55	14.85	19.92	16.63
Pre Mean		15.53	14.15	17.27	14.54	17.23	15.69
Gain (or loss)		- .60	3.00	- .72	.31	2.69	.94
Group Means		15.23	15.65	16.91	14.69	18.58	

TABLE 6 (Continued)

	Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
			Visual Reception			
N's	15	13	11	13	13	
Post Mean	16.00	17.23	17.91	16.00	19.00	17.17
Pre Mean	12.20	13.31	15.55	15.00	12.92	13.69
Gain (or loss)	3.80	3.92	2.36	1.00	6.08	3.48***
Group Means	14.10	15.27	16.73	15.50	15.96	
			Visual Sequential Memory			
N's	15	13	11	13	13	
Post Mean	15.93	16.77	18.64	16.38	17.85	17.03
Pre Mean	15.80	16.15	15.82	17.46	16.38	16.32
Gain (or loss)	.13	.62	2.82	- 1.08	1.47	.71
Group Means	15.87	16.46	17.23	16.92	17.12	
			Auditory Association			
N's	15	13	11	13	13	
Post Mean	14.47	13.23	15.36	16.62	16.08	15.12
Pre Mean	11.40	11.00	12.45	13.31	14.15	12.43
Gain (or loss)	3.07	2.23	2.91	3.31	1.93	2.69***
Group Means	12.93	12.12	13.91	14.96	15.12	

TABLE 6 (Continued)

		Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
Auditory Sequential Memory							
	N's	15	13	11	13	13	
Post Mean		15.93	17.85	20.45	20.62	17.85	18.40
Pre Mean		14.20	15.62	18.27	18.54	16.62	16.52
Gain (or loss)		1.73	2.23	2.18	2.08	1.23	1.88**
Group Means		15.07	16.73	19.36	19.58	17.23	
Visual Association							
	N's	15	13	11	13	13	
Post Mean		18.93	18.77	20.45	20.31	19.85	19.62
Pre Mean		16.00	16.00	17.09	15.69	15.54	16.03
Gain (or loss)		2.93	2.77	3.36	4.62	4.31	3.59***
Group Means		17.47	17.38	18.77	18.00	17.69	
Visual Closure							
	N's	15	13	11	13	13	
Post Mean		23.27	25.08	24.36	19.92	23.69	23.23
Pre Mean		16.87	19.00	20.00	17.23	18.46	18.22
Gain (or loss)		6.36	6.08	4.36	2.69	5.23	5.01***
Group Means		20.07	22.04	22.18	18.58	21.08	

TABLE 6 (Continued)

	Spanish 1	Spanish 2	Spanish 3	Spanish 4	Spanish 5	Trial Means
Verbal Expression						
N's	15	13	11	13	13	
Post Mean	15.33	18.69	19.45	17.92	19.08	17.97
Pre Mean	14.87	17.85	16.64	16.08	19.38	16.91
Gain (or loss)	.46	.84	2.81	1.84	- .30	1.06
Group Means	15.10	18.27	18.05	17.00	19.23	
Grammatic Closure						
N's	15	13	11	13	13	
Post Mean	9.87	8.77	11.18	10.85	13.54	10.80
Pre Mean	7.20	7.23	8.18	7.54	9.62	7.92
Gain (or loss)	2.67	1.54	3.00	3.31	3.92	2.88***
Group Means	8.53	8.00	9.68	9.19	11.58	
Manual Expression						
N's	15	13	11	13	13	
Post Mean	21.60	22.23	25.27	24.85	25.00	23.68
Pre Mean	21.53	23.62	20.55	21.08	27.08	22.80
Gain (or loss)	.07**	- 1.39**	4.72**	3.77**	- 2.08**	.88
Group Means	21.57	22.92	22.91	22.96	26.04	

* p < .05
** p < .01
*** p < .001

Table 6 also indicates trial differences, which are statistically significant on all variables except the following:

Stanford-Binet
    IQ
Metropolitan
    Numbers
Illinois Test of Psycholinguistic Ability
    Auditory Reception
    Visual Sequential Memory
    Verbal Expression
    Manual Expression

Table 6 further indicates groups by trials differences, which are statistically significant, on the following variables:

Metropolitan
    Matching
Gates-MacGinitie
    Following Directions
Illinois Test of Psycholinguistic Ability
    Manual Expression

The ordering of the group gains on the language development tests from highes to lowest, where there were significant differences, is as follows:

	Group Order
Metropolitan	
Matching	5,3,1,4,2

	Group Order
Gates-MacGinitie	
Following Directions	4,1,2,3,5
Illinois Test of Psycholinguistic Ability	
Manual Expression	3,4,1,2,5

Table 7 sets out the results of comparing the three control classes. It indicates group differences, which are statistically significant, between these three control groups on the following variables:

- Stanford-Binet
    - IQ
- Preschool Inventory
    - Total Right
- Metropolitan
    - Listening
- Gates-MacGinitie
    - Listening Comprehension
- Illinois Test of Psycholinguistic Ability
    - Auditory Reception

Table 7 also indicates trial differences, which are statistically significant, on all variables except the following:

- Metropolitan
    - Listening
    - Numbers

TABLE 7

Subjects by Trial Analysis of Variance for the
Control Groups on the Various Measures
at Pre- and Posttesting

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
		Stanford-Binet			
		Chronological Age When Tested			
	N's	13	14	9	
Post Mean		72.69	72.43	74.11	72.94
Pre Mean		67.15	68.14	68.44	67.86
Gain (or loss)		5.54	4.29	5.67	5.08
Group Means		69.92	70.29	71.28	
		Mental Age When Tested			
	N's	13	14	9	
Post Mean		69.46	64.43	63.89	66.11
Pre Mean		61.62	60.00	55.67	59.50
Gain (or loss)		7.84	4.43	8.22	6.61
Group Means		65.54	62.21	59.78	

TABLE 7 (Continued)

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
		IQ			
	N's	13	14	9	
Post Mean		95.62	87.64	84.89	89.83
Pre Mean		91.77	86.71	79.44	86.72
Gain (or loss)		3.85	.93	5.45	3.11*
Group Means		93.69*	87.18*	82.17*	
		Animal House			
		Total Raw Score			
	N's	12	13	9	
Post Mean		49.00	49.92	48.22	49.15
Pre Mean		40.33	29.62	40.00	36.15
Gain (or loss)		8.67*	20.30*	8.22*	13.00***
Group Means		44.67	39.77	44.11	
		Preschool Inventory			
		Total Right			
	N's	12	13	9	
Post Mean		52.42	49.54	45.67	49.53
Pre Mean		49.67	44.38	37.22	44.35
Gain (or loss)		2.75*	5.16*	8.45*	5.18***
Group Means		51.04*	46.96*	41.44*	

TABLE 7 (Continued)

	Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
Metropolitan				
Word Meaning				
N's	13	14	9	
Post Mean	7.54	7.21	5.89	7.00
Pre Mean	5.15	5.50	5.44	5.36
Gain (or loss)	2.39	1.71	.45	1.64***
Group Means	6.35	6.36	5.67	
Listening				
N's	13	14	9	
Post Mean	9.15	9.79	6.33	8.69
Pre Mean	9.23	8.14	8.44	8.61
Gain (or loss)	- .08**	1.65**	- 2.11**	.08
Group Means	9.19*	8.96*	7.39*	
Matching				
N's	13	14	9	
Post Mean	6.85	8.43	7.22	7.56
Pre Mean	5.31	5.43	4.78	5.22
Gain (or loss)	1.54	3.00	2.44	2.34***
Group Means	6.08	6.93	6.00	

TABLE 7 (Continued)

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
			Alphabet		
	N's	13	14	9	
Post Mean		6.23	7.29	6.78	6.78
Pre Mean		5.69	4.29	4.11	4.75
Gain (or loss)		.54*	3.00*	2.67*	2.03***
Group Means		5.96	5.79	5.44	
			Numbers		
	N's	13	14	9	
Post Mean		8.08	7.64	7.44	7.75
Pre Mean		9.62	7.21	7.11	8.06
Gain (or loss)		- 1.54	.43	.33	- .31
Group Means		8.85	7.43	7.28	
			Copying		
	N's	13	14	9	
Post Mean		3.54	4.50	4.22	4.08
Pre Mean		2.31	3.14	2.33	2.64
Gain (or loss)		1.23	1.36	1.89	1.44**
Group Means		2.92	3.82	3.28	

TABLE 7 (Continued)

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
			Total Subtest Score		
	N's	13	14	9	
Post Mean		41.38	44.14	35.67	41.03
Pre Mean		37.31	33.71	32.22	34.64
Gain (or loss)		4.07*	10.43*	3.45*	6.39***
Group Means		39.35	38.93	33.94	
			Gates-MacGinitie		
			Listening Comprehension		
	N's	13	13	9	
Post Mean		10.77	12.62	9.00	11.00
Pre Mean		9.85	10.69	7.89	9.66
Gain (or loss)		.92	1.93	1.11	1.34**
Group Means		10.31*	11.65*	8.44*	
			Auditory Discrimination		
	N's	13	13	9	
Post Mean		15.46	17.15	15.67	16.14
Pre Mean		15.38	14.31	13.44	14.49
Gain (or loss)		.08*	2.84*	2.23*	1.65**
Group Means		15.42	15.73	14.56	

TABLE 7 (Continued)

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
		Visual Discrimination			
	N's	13	13	9	
Post Mean		12.15	11.15	9.56	11.11
Pre Mean		9.54	9.62	8.11	9.20
Gain (or loss)		2.61	1.53	1.45	1.91**
Group Means		10.85	10.38	8.83	
		Following Directions			
	N's	13	13	9	
Post Mean		8.08	8.15	6.78	7.77
Pre Mean		8.54	6.23	5.11	6.80
Gain (or loss)		-.46	1.92	1.67	.97*
Group Means		8.31	7.19	5.94	
		Letter Recognition			
	N's	13	13	9	
Post Mean		8.54	6.85	6.56	7.40
Pre Mean		6.62	4.77	4.56	5.40
Gain (or loss)		1.92	2.08	2.00	2.00***
Group Means		7.58	5.81	5.56	

TABLE 7 (Continued)

	Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
		Visual-motor Coordination		
N's	13	13	9	
Post Mean	9.23	9.92	8.56	9.31
Pre Mean	7.62	7.54	7.22	7.49
Gain (or loss)	1.61	2.38	1.34	1.82**
Group Means	8.42	8.73	7.89	
		Auditory Blending		
N's	13	13	9	
Post Mean	8.23	9.23	8.22	8.60
Pre Mean	6.00	6.85	6.00	6.31
Gain (or loss)	2.23	2.38	2.22	2.29***
Group Means	7.12	8.04	7.11	
		Word Recognition		
N's	13	13	9	
Post Mean	11.31	9.00	8.89	9.83
Pre Mean	9.62	9.08	8.44	9.11
Gain (or loss)	1.69	- .08	.45	.72
Group Means	10.46	9.04	8.67	

TABLE 7 (Continued)

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
		Total Weighted Score			
	N's	13	13	9	
Post Mean		50.31	51.77	45.89	49.71
Pre Mean		46.38	41.15	37.78	42.23
Gain (or loss)		3.93	10.62	8.11	7.48***
Group Means		48.35	46.46	41.83	
		Illinois Test of Psycholinguistic Ability			
		Sum of Raw Scores			
	N's	13	14	7	
Post Mean		193.46	193.14	167.00	187.88
Pre Mean		171.62	158.79	136.86	159.18
Gain (or loss)		21.84	34.35	30.14	28.70***
Group Means		182.54	175.96	151.93	
		Auditory Reception			
	N's	13	14	7	
Post Mean		23.15	23.93	14.00	21.59
Pre Mean		20.85	18.00	14.57	18.38
Gain (or loss)		2.30*	5.93*	- .57*	3.21**
Group Means		22.00**	20.96**	14.29**	

TABLE 7 (Continued)

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
			Visual Reception		
	N's	13	14	7	
Post Mean		16.92	21.00	18.29	18.88
Pre Mean		16.23	16.00	15.86	16.06
Gain (or loss)		.69	5.00	2.43	2.82**
Group Means		16.58	18.50	17.07	
			Visual Sequential Memory		
	N's	13	14	7	
Post Mean		16.08	16.29	14.14	15.76
Pre Mean		13.46	14.14	12.86	13.62
Gain (or loss)		2.62	2.15	1.28	2.14**
Group Means		14.77	15.21	13.50	
			Auditory Association		
	N's	13	14	7	
Post Mean		18.54	17.57	14.43	17.29
Pre Mean		16.23	14.86	12.43	14.88
Gain (or loss)		2.31	2.71	2.00	2.41***
Group Means		17.38	16.21	13.43	

TABLE 7 (Continued)

		Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
		Auditory Sequential Memory			
	N's	13	14	7	
Post Mean		21.15	21.14	18.71	20.65
Pre Mean		20.23	18.86	16.57	18.91
Gain (or loss)		.92	2.28	2.14	1.74**
Group Means		20.69	20.00	17.64	
		Visual Association			
	N's	13	14	7	
Post Mean		20.00	20.29	19.86	20.09
Pre Mean		17.46	17.79	15.43	17.18
Gain (or loss)		2.54	2.50	4.43	2.91***
Group Means		18.73	19.04	17.64	
		Visual Closure			
	N's	13	14	7	
Post Mean		24.85	23.71	22.71	23.94
Pre Mean		18.08	17.50	17.43	17.71
Gain (or loss)		6.77	6.21	5.28	6.23***
Group Means		21.46	20.61	20.07	

TABLE 7 (Continued)

	Control Group Monitored	English Control Unmonitored	Spanish Control Unmonitored	Trial Means
		Verbal Expression		
N's	13	14	7	
Post Mean	22.46	21.00	18.57	21.06
Pre Mean	22.92	20.00	15.43	20.18
Gain (or loss)	- .46	1.00	3.14	.88
Group Means	22.69	20.50	17.00	
		Grammatic Closure		
N's	13	14	7	
Post Mean	14.08	13.29	11.86	13.29
Pre Mean	12.92	9.79	8.29	10.68
Gain (or loss)	1.16	3.50	3.57	2.61***
Group Means	13.50	11.54	10.07	
		Manual Expression		
N's	13	14	7	
Post Mean	25.23	23.93	23.43	24.32
Pre Mean	22.23	20.86	17.00	20.59
Gain (or loss)	3.00	3.07	6.43	3.73***
Group Means	23.73	22.39	20.21	

* $p < .05$
** $p < .01$
*** $p < .001$

Gates-MacGinitie
    Word Recognition
Illinois Test of Psycholinguistic Ability
    Verbal Expression

Table 7 further indicates groups by trials differences, which are statistically significant, on the following variables:

Animal House
    Total Raw Score
Preschool Inventory
    Total Right
Metropolitan
    Listening
    Alphabet
    Total Subtest Score
Gates-MacGinitie
    Auditory Discrimination
Illinois Test of Psycholinguistic Ability
    Auditory Reception

The ordering of the group gains on the language development tests from highest to lowest, where there were significant differences, is as follows:

	Group Order
Metropolitan	
Listening	2,1,3
Alphabet	2,3,1
Total Subtest Score	2,1,3

	Group Order
Gates-MacGinitie	
Auditory Discrimination	2,3,1
Illinois Test of Psycholinguistic Ability	
Auditory Reception	2,1,3

Table 8 sets out the results of comparing three groups of subjects as follows:

Group 1 - all English Experimentals

Group 2 - all Spanish Experimentals

Group 3 - all Controls

It indicates group differences, which are statistically significant, between the three groups on the following variables:

Preschool Inventory
    Total Right
Metropolitan
    Alphabet
    Copying
    Total Subtest Score
Gates-MacGinitie
    Letter Recognition
    Auditory Blending
    Total Weighted Score
Illinois Test of Psycholinguistic Ability
    Sum of Raw Scores
    Auditory Reception

TABLE 8

Subjects by Trial Analysis of Variance Comparing English Experimentals versus Spanish Experimentals versus Controls on the Various Measures at Pre- and Posttesting

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
Stanford-Binet					
Chronological Age When Tested					
	N's	68	66	36	
Post Mean		72.34	73.12	72.94	72.77
Pre Mean		66.46	67.45	67.86	67.14
Gain (or loss)		5.88*	5.67*	5.08*	5.63***
Group Means		69.40	70.29	70.40	
Mental Age When Tested					
	N's	68	66	36	
Post Mean		66.76	63.62	66.11	65.41
Pre Mean		59.93	57.76	59.50	58.99
Gain (or loss)		6.83	5.86	6.61	6.42***
Group Means		63.35	60.69	62.81	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
			IQ		
	N's	68	66	36	
Post Mean		91.47	85.70	89.83	88.88
Pre Mean		89.13	84.29	86.72	86.74
Gain (or loss)		2.34	1.41	3.11	2.14***
Group Means		90.30	84.99	88.28	
			Animal House		
			Total Raw Score		
	N's	65	65	34	
Post Mean		46.23	44.35	49.15	46.09
Pre Mean		36.29	39.57	36.15	37.56
Gain (or loss)		9.94**	4.78**	13.00**	8.53***
Group Means		41.26	41.96	42.65	
			Preschool Inventory		
			Total Right		
	N's	65	65	34	
Post Mean		49.15	45.42	49.53	47.75
Pre Mean		43.75	37.62	44.35	41.45
Gain (or loss)		5.40*	7.80*	5.18*	6.30***
Group Means		46.45**	41.52**	46.94**	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
Metropolitan					
Word Meaning					
	N's	64	64	36	
Post Mean		6.13	6.30	7.00	6.38
Pre Mean		5.91	5.55	5.36	5.65
Gain (or loss)		.22*	.75*	1.64*	.73***
Group Means		6.02	5.92	6.18	
Listening					
	N's	64	64	36	
Post Mean		7.53	7.31	8.69	7.70
Pre Mean		8.83	8.88	8.61	8.80
Gain (or loss)		- 1.30*	- 1.57*	.08*	- 1.10***
Group Means		8.18	8.09	8.65	
Matching					
	N's	64	64	36	
Post Mean		7.14	7.94	7.56	7.54
Pre Mean		5.77	6.28	5.22	5.85
Gain (or loss)		1.37	1.66	2.34	1.69***
Group Means		6.45	7.11	6.39	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
			Alphabet		
	N's	64	64	36	
Post Mean		11.89	12.53	6.78	11.02
Pre Mean		7.86	7.88	4.75	7.18
Gain (or loss)		4.03**	4.65**	2.03**	3.84***
Group Means		9.88***	10.20***	5.76***	
			Numbers		
	N's	64	64	36	
Post Mean		7.19	8.83	7.75	7.95
Pre Mean		8.06	8.45	8.06	8.21
Gain (or loss)		- .87*	.38*	- .31*	- .26
Group Means		7.63	8.64	7.90	
			Copying		
	N's	64	64	36	
Post Mean		3.75	5.11	4.08	4.35
Pre Mean		3.72	4.38	2.64	3.74
Gain (or loss)		.03*	.73*	1.44*	.61**
Group Means		3.73*	4.74*	3.36*	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
			Total Subtest Score		
	N's	64	64	36	
Post Mean		43.66	47.89	41.03	44.73
Pre Mean		40.02	41.39	34.64	39.37
Gain (or loss)		3.64	6.50	6.39	5.36***
Group Means		41.84*	44.64*	37.83*	
			Gates-MacGinitie		
			Listening Comprehension		
	N's	60	64	35	
Post Mean		11.10	10.95	11.00	11.02
Pre Mean		10.15	10.00	9.66	9.98
Gain (or loss)		.95	.95	1.34	1.04***
Group Means		10.63	10.48	10.33	
			Auditory Discrimination		
	N's	60	64	35	
Post Mean		16.97	16.67	16.14	16.67
Pre Mean		15.85	15.16	14.49	15.27
Gain (or loss)		1.12	1.51	1.65	1.40***
Group Means		16.41	15.91	15.31	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
		Visual Discrimination			
	N's	60	64	35	
Post Mean		12.00	12.00	11.11	11.81
Pre Mean		10.60	9.52	9.20	9.86
Gain (or loss)		1.40	2.48	1.91	1.95***
Group Means		11.30	10.76	10.16	
		Following Directions			
	N's	60	64	35	
Post Mean		7.48	7.09	7.77	7.39
Pre Mean		6.67	6.34	6.80	6.57
Gain (or loss)		.81	.75	.97	.82***
Group Means		7.08	6.72	7.29	
		Letter Recognition			
	N's	60	64	35	
Post Mean		13.40	13.89	7.40	12.28
Pre Mean		8.92	8.94	5.40	8.15
Gain (or loss)		4.48***	4.95***	2.00***	4.13***
Group Means		11.16***	11.41***	6.40***	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
		Visual-motor Coordination			
	N's	60	64	35	
Post Mean		9.20	9.75	9.31	9.45
Pre Mean		7.47	8.73	7.49	7.98
Gain (or loss)		1.73	1.02	1.82	1.47***
Group Means		8.33	9.24	8.40	
		Auditory Blending			
	N's	60	64	35	
Post Mean		8.65	9.75	8.60	9.08
Pre Mean		6.33	7.58	6.31	6.83
Gain (or loss)		2.32	2.17	2.29	2.25***
Group Means		7.49**	8.66**	7.46**	
		Word Recognition			
	N's	60	64	35	
Post Mean		9.82	9.53	9.83	9.70
Pre Mean		8.53	8.44	9.11	8.62
Gain (or loss)		1.29	1.09	.72	1.08***
Group Means		9.18	8.98	9.47	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
		Total Weighted Score			
	N's	60	64	35	
Post Mean		57.87	57.67	49.71	55.99
Pre Mean		48.12	47.81	42.23	46.70
Gain (or loss)		9.75	9.86	7.48	9.29***
Group Means		52.99*	52.74*	45.97*	
		Illinois Test of Psycholinguistic Ability			
		Sum of Raw Scores			
	N's	65	65	34	
Post Mean		183.74	169.63	186.88	178.80
Pre Mean		159.46	146.54	158.18	154.07
Gain (or loss)		24.28	23.09	28.70	24.73***
Group Means		171.60*	158.08*	172.53*	
		Auditory Reception			
	N's	65	65	34	
Post Mean		19.60	15.60	20.59	18.22
Pre Mean		16.69	14.69	17.38	16.04
Gain (or loss)		2.91*	.91*	3.21*	2.18***
Group Means		18.15***	15.15***	18.99***	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
		Visual Reception			
	N's	65	65	34	
Post Mean		16.80	16.17	17.88	16.77
Pre Mean		12.23	12.69	15.06	13.00
Gain (or loss)		4.57	3.48	2.82	3.77***
Group Means		14.52	14.43	16.47	
		Visual Sequential Memory			
	N's	65	65	34	
Post Mean		15.60	16.03	14.76	15.60
Pre Mean		14.17	15.32	12.62	14.30
Gain (or loss)		1.43	.71	2.14	1.30***
Group Means		14.88*	15.68*	13.69*	
		Auditory Association			
	N's	65	65	34	
Post Mean		17.42	14.12	16.29	15.88
Pre Mean		14.48	11.43	13.88	13.15
Gain (or loss)		2.94	2.69	2.41	2.73***
Group Means		15.95**	12.78**	15.09**	

TABLE 8 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
	Auditory Sequential Memory			
N's	65	65	34	
Post Mean	21.78	17.40	19.65	19.60
Pre Mean	20.55	15.52	17.91	18.01
Gain (or loss)	1.23	1.88	1.74	1.59***
Group Means	21.17**	16.46**	18.78**	
	Visual Association			
N's	65	65	34	
Post Mean	18.26	18.62	19.09	18.57
Pre Mean	15.06	15.03	16.18	15.28
Gain (or loss)	3.20	3.59	2.91	3.29***
Group Means	16.66	16.82	17.63	
	Visual Closure			
N's	65	65	34	
Post Mean	20.97	22.23	22.94	21.88
Pre Mean	17.17	17.22	16.71	17.09
Gain (or loss)	3.80*	5.01*	6.23*	4.79***
Group Means	19.07	19.72	19.82	

TABLE 8 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups	Trial Means
			Verbal Expression		
	N's	65	65	34	
Post Mean		18.65	16.97	20.06	18.27
Pre Mean		17.12	15.91	19.18	17.07
Gain (or loss)		1.53	1.06	.88	1.20*
Group Means		17.88*	16.44*	19.62*	
			Grammatic Closure		
	N's	65	65	34	
Post Mean		12.74	9.80	12.29	11.48
Pre Mean		10.00	6.92	9.68	8.71
Gain (or loss)		2.74	2.88	2.61	2.77***
Group Means		11.37***	8.36***	10.99***	
			Manual Expression		
	N's	65	65	34	
Post Mean		21.92	22.68	23.32	22.51
Pre Mean		22.14	21.80	19.59	21.48
Gain (or loss)		- .22**	.88**	3.73**	1.03*
Group Means		22.03	22.24	21.46	

* $p < .05$
** $p < .01$
*** $p < .001$

- Visual Sequential Memory
- Auditory Association
- Auditory Sequential Memory
- Verbal Expression
- Grammatic Closure

Table 8 also indicates trial differences, which are statistically significant, on all variables except the Numbers Subtest of the Metropolitan. Table 8 further indicates groups by trials differences which are statistically significant, on the following variables:

- Animal House
    - Total Raw Score
- Preschool Inventory
    - Total Right
- Metropolitan
    - Word Meaning
    - Listening
    - Alphabet
    - Numbers
    - Copying
- Gates-MacGinitie
    - Letter Recognition
- Illinois Test of Psycholinguistic Ability
    - Auditory Reception
    - Visual Closure
    - Manual Expression

The ordering of the group gains on the language development tests from highest to lowest, where there were significant differences, is as follows:

	Group Order
Metropolitan	
Word Meaning	3,2,1
Listening	3,2,1
Alphabet	2,1,3
Numbers	2,3,1
Copying	3,2,1
Gates-MacGinitie	
Letter Recognition	2,1,3
Illinois Test of Psycholinguistic Ability	
Auditory Reception	3,1,2
Visual Closure	3,2,1
Manual Expression	3,2,1

Since it became apparent in inspecting Table 7, which is an analysis of the Controls, that Group 2 - English Unmonitored Controls was showing substantially more gain than the other two Control Groups, and the fact that in some cases the Controls were surpassing the Experimentals on unexpected variables, it was decided to develop Table 9, which compares the following three groups:

Group 1 - all English Experimentals
Group 2 - all Spanish Experimentals
Group 3 - all Controls, omitting the English Unmonitored class.

TABLE 9

Subjects by Trial Analysis of Variance Comparing English Experimentals versus Spanish Experimentals versus Controls (Omitting English Unmonitored) on the Various Measures at Pre- and Posttesting

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
Stanford-Binet					
Chronological Age When Tested					
	N's	68	66	22	
Post Mean		72.31	73.12	73.27	72.79
Pre Mean		66.46	67.45	67.68	67.05
Gain (or loss)		5.85	5.67	5.59	5.74
Group Means		69.38	70.29	70.48	
Mental Age When Tested					
	N's	68	66	22	
Post Mean		65.82	63.62	67.18	65.08
Pre Mean		59.93	57.76	59.18	58.90
Gain (or loss		5.89	5.86	8.00	6.18
Group Means		62.88	60.69	63.18	

TABLE 9 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
		IQ		
N's	68	66	22	
Post Mean	97.87	85.70	91.23	91.78
Pre Mean	89.13	84.29	86.73	86.74
Gain (or loss)	8.74	1.41	4.50	5.04
Group Means	93.50	84.99	88.98	
		Animal House		
		Total Raw Score		
N's	65	65	21	
Post Mean	46.23	44.35	48.67	45.76
Pre Mean	36.29	39.57	40.19	38.25
Gain (or loss)	9.94*	4.78*	8.48*	7.51***
Group Means	41.26	41.96	44.43	
		Preschool Inventory		
		Total Right		
N's	65	65	21	
Post Mean	49.15	45.42	49.52	47.60
Pre Mean	43.75	37.62	44.33	41.19
Gain (or loss)	5.40*	7.80*	5.19*	6.41***
Group Means	46.45**	41.52**	46.93**	

TABLE 9 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
		Metropolitan		
		Word Meaning		
N's	64	64	22	
Post Mean	6.13	6.30	6.86	6.31
Pre Mean	5.91	5.55	5.27	5.66
Gain (or loss)	.22	.75	1.59	.65**
Group Means	6.02	5.92	6.07	
		Listening		
N's	64	64	22	
Post Mean	7.53	7.31	8.00	7.51
Pre Mean	8.83	8.88	8.91	8.86
Gain (or loss)	- 1.30	- 1.57	- .91	- 1.35***
Group Means	8.18	8.09	8.45	
		Matching		
N's	64	64	22	
Post Mean	7.14	7.94	7.00	7.46
Pre Mean	5.77	6.28	5.09	5.89
Gain (or loss)	1.37	1.66	1.91	1.57***
Group Means	6.45	7.11	6.05	

TABLE 9 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
			Alphabet		
	N's	64	64	22	
Post Mean		11.89	12.53	6.45	11.37
Pre Mean		7.86	7.88	5.05	7.45
Gain (or loss)		4.03**	4.65**	1.40**	3.92***
Group Means		9.88***	10.20***	5.75***	
			Numbers		
	N's	64	64	22	
Post Mean		7.19	8.83	7.82	7.98
Pre Mean		8.06	8.45	8.59	8.31
Gain (or loss)		- .87*	.38*	- .77*	- .33
Group Means		7.63	8.64	8.20	
			Copying		
	N's	64	64	22	
Post Mean		3.75	5.11	3.82	4.34
Pre Mean		3.72	4.38	2.32	3.79
Gain (or loss)		.03	.73	1.50	.55*
Group Means		3.73*	4.74*	3.07*	

TABLE 9 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
Total Subtest Score				
N's	64	64	22	
Post Mean	43.66	47.89	39.05	44.79
Pre Mean	40.02	41.39	35.23	39.90
Gain (or loss)	3.64	6.50	3.82	4.89***
Group Means	41.84*	44.64*	37.14*	
Gates-MacGinitie				
Listening Comprehension				
N's	60	64	22	
Post Mean	11.10	10.95	10.05	10.88
Pre Mean	10.15	10.00	9.05	9.92
Gain (or loss)	.95	.95	1.00	.96***
Group Means	10.63	10.48	9.55	
Auditory Discrimination				
N's	60	64	22	
Post Mean	16.97	16.67	15.55	16.62
Pre Mean	15.85	15.16	14.59	15.36
Gain (or loss)	1.12	1.51	.96	1.26***
Group Means	16.41	15.91	15.07	

TABLE 9 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
		Visual Discrimination		
N's	60	64	22	
Post Mean	12.00	12.00	11.09	11.86
Pre Mean	10.60	9.52	8.95	9.88
Gain (or loss)	1.40	2.48	2.14	1.98***
Group Means	11.30	10.76	10.02	
		Following Directions		
N's	60	64	22	
Post Mean	7.48	7.09	7.55	7.32
Pre Mean	6.67	6.34	7.14	6.60
Gain (or loss)	.81	.75	.41	.72***
Group Means	7.08	6.72	7.34	
		Letter Recognition		
N's	60	64	22	
Post Mean	13.40	13.89	7.73	12.76
Pre Mean	8.92	8.94	5.77	8.45
Gain (or loss)	4.48**	4.95**	1.96**	4.31***
Group Means	11.16***	11.41***	6.75***	

TABLE 9 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
Visual-motor Coordination				
N's	60	64	22	
Post Mean	9.20	9.75	8.95	9.40
Pre Mean	9.75	8.73	7.45	8.02
Gain (or loss)	1.73	1.02	1.50	1.38***
Group Means	8.33**	9.24**	8.20**	
Auditory Blending				
N's	60	64	22	
Post Mean	8.65	9.75	8.23	9.07
Pre Mean	6.33	7.58	6.00	6.83
Gain (or loss)	2.32	2.17	2.23	2.24***
Group Means	7.49**	8.66**	7.11**	
Word Recognition				
N's	60	64	22	
Post Mean	9.82	9.53	10.32	9.77
Pre Mean	8.53	8.44	9.14	8.58
Gain (or loss)	1.29	1.09	1.18	1.19***
Group Means	9.18	8.98	9.73	

TABLE 9 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
Total Weighted Score					
	N's	60	64	22	
Post Mean		57.87	57.67	48.50	56.37
Pre Mean		48.12	47.81	42.86	47.19
Gain (or loss)		9.75	9.86	5.64	9.18***
Group Means		52.99	52.74	45.68	
Illinois Test of Psycholinguistic Ability					
Sum of Raw Scores					
	N's	65	65	20	
Post Mean		183.62	169.57	183.20	177.47
Pre Mean		159.12	146.54	158.45	153.58
Gain (or loss)		24.50	23.03	24.75	23.89***
Group Means		171.37*	158.05*	170.83*	
Auditory Reception					
	N's	64	65	20	
Post Mean		19.61	15.58	18.95	17.77
Pre Mean		16.70	14.69	17.65	15.95
Gain (or loss)		2.91	.89	1.30	1.82***
Group Means		18.16**	15.14**	18.30**	

TABLE 9 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
		Visual Reception		
N's	64	65	20	
Post Mean	16.83	16.17	16.40	16.48
Pre Mean	12.41	12.69	15.10	12.89
Gain (or loss)	4.42	3.48	1.30	3.59***
Group Means	14.62	14.43	15.75	
		Visual Sequential Memory		
N's	64	65	20	
Post Mean	15.61	16.03	14.40	15.63
Pre Mean	14.31	15.32	12.25	14.48
Gain (or loss)	1.30	.71	2.15	1.15**
Group Means	14.96*	15.68*	13.33*	
		Auditory Association		
N's	64	65	20	
Post Mean	17.42	14.12	16.10	15.81
Pre Mean	14.52	11.43	13.90	13.09
Gain (or loss)	2.90	2.69	2.20	2.72***
Group Means	15.97**	12.78**	15.00**	

TABLE 9 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
		Auditory Sequential Memory			
	N's	64	65	20	
Post Mean		21.73	17.40	19.30	19.52
Pre Mean		20.63	15.52	17.95	18.04
Gain (or loss)		1.10	1.88	1.35	1.48***
Group Means		21.18**	16.46**	18.63**	
		Visual Association			
	N's	64	65	20	
Post Mean		18.34	18.62	18.95	18.54
Pre Mean		15.19	15.03	15.75	15.19
Gain (or loss)		3.15	3.59	3.20	3.35***
Group Means		16.77	16.82	17.35	
		Visual Closure			
	N's	64	65	20	
Post Mean		21.02	22.23	23.10	21.83
Pre Mean		17.25	17.22	16.85	17.18
Gain (or loss)		3.77	5.01	6.25	4.65***
Group Means		19.13	19.72	19.98	

TABLE 9 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Control Groups (Omitting English Unmonitored)	Trial Means
		Verbal Expression		
N's	64	65	20	
Post Mean	18.61	16.97	20.10	18.09
Pre Mean	17.06	15.91	19.30	16.86
Gain (or loss)	1.55	1.06	.80	1.23*
Group Means	17.84	16.44	19.70	
		Grammatic Closure		
N's	64	65	20	
Post Mean	12.63	9.75	12.30	11.33
Pre Mean	10.03	6.92	10.30	8.71
Gain (or loss)	2.60	2.83	2.00	2.62***
Group Means	11.33***	8.34***	11.30***	
		Manual Expression		
N's	64	65	20	
Post Mean	22.00	22.68	23.60	22.51
Pre Mean	22.19	21.80	19.40	21.64
Gain (or loss)	- .19**	.88**	4.20**	.87*
Group Means	22.09	22.24	21.50	

* $p < .05$
** $p < .01$
*** $p < .001$

The results of this analysis indicate that the Controls surpassed Experimentals in lanugage development only on the Manual Expression Subtest of the ITPA.

Table 10 sets out the results of comparing the following two groups:

Group 1 - all English Experimentals

Group 2 - all Spanish Experimentals

It indicates group differences, which are statistically significant, between these two experimental groups on the following variables:

- Stanford-Binet
  - IQ
- Preschool Inventory
  - Total Right
- Metropolitan
  - Copying
- Gates-MacGinitie
  - Auditory Blending
- Illinois Test of Psycholinguistic
  - Sum of Raw Scores
  - Auditory Reception
  - Auditory Association
  - Auditory Sequential Memory
  - Grammatic Closure

TABLE 10

Subjects by Trial Analysis of Variance Comparing English Experimentals versus Spanish Experimentals on the Various Measures at Pre- and Posttesting

		English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
		Stanford-Binet		
		Chronological Age When Tested		
	N's	68	66	
Post Mean		72.34	73.12	72.72
Pre Mean		66.46	67.45	66.95
Gain (or loss)		5.88	5.67	5.77
Group Means		69.40	70.29	
		Mental Age When Tested		
	N's	68	66	
Post Mean		66.76	63.62	65.22
Pre Mean		59.93	57.76	58.86
Gain (or loss)		6.83	5.86	6.36
Group Means		63.35	60.69	

TABLE 10 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
		IQ		
	N's	68	66	
Post Mean		91.47	85.70	88.63
Pre Mean		89.13	84.29	86.75
Gain (or loss)		2.34	1.41	1.88**
Group Means		90.30*	84.99*	
		Animal House		
		Total Raw Score		
	N's	65	65	
Post Mean		46.23	44.35	45.29
Pre Mean		36.29	39.57	37.93
Gain (or loss)		9.94**	4.78**	7.36***
Group Means		41.26	41.96	
		Preschool Inventory		
		Total Right		
	N's	65	65	
Post Mean		49.15	45.42	47.28
Pre Mean		43.75	37.62	40.68
Gain (or loss)		5.40*	7.80*	6.60***
Group Means		46.45**	41.52**	

TABLE 10 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
	Metropolitan		
	Word Meaning		
N's	64	64	
Post Mean	6.13	6.30	6.21
Pre Mean	5.91	5.55	5.73
Gain (or loss)	.22	.75	.48*
Group Means	6.02	5.92	
	Listening		
N's	64	64	
Post Mean	7.53	7.31	7.42
Pre Mean	8.83	8.88	8.85
Gain (or loss)	- 1.30	- 1.57	- 1.43***
Group Means	8.18	8.09	
	Matching		
N's	64	64	
Post Mean	7.14	7.94	7.54
Pre Mean	5.77	6.28	6.02
Gain (or loss)	1.37	1.66	1.52***
Group Means	6.45	7.11	

TABLE 10 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
		Alphabet		
	N's	64	64	
Post Mean		11.89	12.53	12.21
Pre Mean		7.86	7.88	7.87
Gain (or loss)		4.03	4.65	4.34***
Group Means		9.88	10.20	
		Numbers		
	N's	64	64	
Post Mean		7.19	8.83	8.01
Pre Mean		8.06	8.45	8.26
Gain (or loss)		- .87*	.38*	- .25
Group Means		7.63	8.64	
		Copying		
	N's	64	64	
Post Mean		3.75	5.27	4.51
Pre Mean		3.72	4.38	4.05
Gain (or loss)		.03	.89	.46
Group Means		3.73*	4.82*	

TABLE 10 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
	Total Subtest Score		
N's	64	64	
Post Mean	43.66	47.89	45.77
Pre Mean	40.02	41.39	40.70
Gain (or loss)	3.64	6.50	5.07***
Group Means	41.84	44.64	
	Gates-MacGinitie		
	Listening Comprehension		
N's	60	64	
Post Mean	11.10	10.95	11.02
Pre Mean	10.15	10.00	10.07
Gain (or loss)	.95	.95	.95**
Group Means	10.63	10.48	
	Auditory Discrimination		
N's	60	64	
Post Mean	16.97	16.67	16.81
Pre Mean	15.85	15.16	15.49
Gain (or loss)	1.12	1.51	1.32***
Group Means	16.41	15.91	

TABLE 10 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
	Visual Discrimination		
N's	60	64	
Post Mean	12.00	12.00	12.00
Pre Mean	10.60	9.52	10.04
Gain (or loss)	1.40	2.48	1.96***
Group Means	11.30	10.76	
	Following Directions		
N's	60	64	
Post Mean	7.48	7.09	7.28
Pre Mean	6.67	6.34	6.50
Gain (or loss)	.81	.75	.78***
Group Means	7.08	6.72	
	Letter Recognition		
N's	60	64	
Post Mean	13.40	13.89	13.65
Pre Mean	8.92	8.94	8.93
Gain (or loss)	4.48	4.95	4.72***
Group Means	11.16	11.41	

TABLE 10 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
		Visual-motor Coordination		
	N's	60	64	
Post Mean		9.20	9.75	9.48
Pre Mean		7.47	8.73	8.12
Gain (or loss)		1.73	1.02	1.36***
Group Means		8.33	9.24	
		Auditory Blending		
	N's	60	64	
Post Mean		8.65	9.75	9.22
Pre Mean		6.33	7.58	6.98
Gain (or loss)		2.32	2.17	2.24***
Group Means		7.49**	8.66**	
		Word Recognition		
	N's	60	64	
Post Mean		9.82	9.53	9.67
Pre Mean		8.53	8.44	8.48
Gain (or loss)		1.29	1.09	1.19***
Group Means		9.18	8.98	

TABLE 10 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
	Total Weighted Score		
N's	60	64	
Post Mean	57.87	57.67	57.77
Pre Mean	48.12	47.81	47.96
Gain (or loss)	9.75	9.86	9.81***
Group Means	52.99	52.74	
	Illinois Test of Psycholinguistic Ability		
	Sum of Raw Scores		
N's	65	65	
Post Mean	183.83	169.66	176.75
Pre Mean	159.46	146.54	153.00
Gain (or loss)	24.37	23.12	23.75***
Group Means	171.65*	158.10*	
	Auditory Reception		
N's	65	65	
Post Mean	19.63	15.63	17.63
Pre Mean	16.69	14.69	15.69
Gain (or loss)	2.94*	.94*	1.94***
Group Means	18.16***	15.16***	

TABLE 10 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
	Visual Reception		
N's	65	65	
Post Mean	16.80	16.17	16.48
Pre Mean	12.23	12.69	12.46
Gain (or loss)	4.57	3.48	4.02***
Group Means	14.52	14.43	
	Visual Sequential Memory		
N's	65	65	
Post Mean	15.60	16.03	15.82
Pre Mean	14.17	15.32	14.75
Gain (or loss)	1.43	.71	1.07**
Group Means	14.88	15.68	
	Auditory Association		
N's	65	65	
Post Mean	17.42	14.12	15.77
Pre Mean	14.48	11.43	12.95
Gain (or loss)	2.94	2.69	2.82***
Group Means	15.95***	12.78***	

TABLE 10 (Continued)

		English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
		Auditory Sequential Memory		
	N's	65	65	
Post Mean		21.78	17.40	19.59
Pre Mean		20.55	15.52	18.04
Gain (or loss)		1.23	1.88	1.55***
Group Means		21.17***	16.46***	
		Visual Association		
	N's	65	65	
Post Mean		18.26	18.62	18.44
Pre Mean		15.06	15.03	15.05
Gain (or loss)		3.20	3.59	3.39***
Group Means		16.66	16.82	
		Visual Closure		
	N's	65	65	
Post Mean		20.97	22.23	21.60
Pre Mean		17.17	17.22	17.19
Gain (or loss)		3.80	5.01	4.41***
Group Means		19.07	19.72	

TABLE 10 (Continued)

	English Speaking Experimentals	Spanish Speaking Experimentals	Trial Means
Verbal Expression			
N's	65	65	
Post Mean	18.65	16.97	17.81
Pre Mean	17.12	15.91	16.52
Gain (or loss)	1.53	1.06	1.29*
Group Means	17.88	16.44	
Grammatic Closure			
N's	65	65	
Post Mean	12.80	9.80	11.30
Pre Mean	10.00	6.92	8.46
Gain (or loss)	2.80	2.88	2.84***
Group Means	11.40***	8.36***	
Manual Expression			
N's	65	65	
Post Mean	21.92	22.68	22.30
Pre Mean	22.14	21.80	21.97
Gain (or loss)	- .22	.88	.33
Group Means	22.03	22.24	

* p < .05
** p < .01
*** p < .001

Table 10 also indicates trial differences, which are statistically significant, on all the variables except the following:

- Metropolitan
    - Numbers
    - Copying
- Illinois Test of Psycholinguistic Ability
    - Manual Expression

Table 10 further indicates groups by trials differences, which are statistically significant, on the following variables:

- Animal House
    - Total Raw Score
- Preschool Inventory
    - Total Right
- Metropolitan
    - Numbers
- Illinois Test of Psycholinguistic Ability
    - Auditory Reception

The ordering of the group gains on all variables from highest to lowest, where there were significant differences, is as follows:

	Group Order
Animal House	
Total Raw Score	1,2
Preschool Inventory	
Total Right	2,1

	Group Order
Metropolitan	
Numbers	2,1
Illinois Test of Psycholinguistic Ability	
Auditory Reception	1,2

Table 11 summarizes all of the groups by trials analyses of variance, the details of which are included in Tables 5 through 10.

Gain Score Differences by Multiple Linear Regression

The analysis of variance approach to examining differences in gain as between groups makes no allowance for the fact that the groups under consideration differ as to IQ, Chronological Age, and other variables which logic indicates might affect rates of gain. However, a multiple linear regression approach to the question does furnish a vehicle for controlling statistically for these contaminating variables. Therefore, multiple linear regression analyses were run, and the results are reported in this section.

The multiple linear regression approach to this problem is to see if there is a significant difference in the squares of the multiple correlation coefficient of two sets of equations by means of an F test. One of the sets of equations has knowledge of group membership but the other does not. Both sets have knowledge of the contaminating variables. In these analyses the contaminating variables were taken to be:

1. Stanford-Binet - IQ
2. Chronological age at pretesting

TABLE 11

Summary Table of Tables 5-10

Measures	Table 5 English 5 Groups			Table 6 Spanish 5 Groups			Table 7 Controls 3 Groups			Table 8 EngXSpnXCont Groups 1X2X3			Table 9 EngXSpnXCont Groups 1X2X3 Omitting some			Table 10 EngXSpn Groups 1X2		
	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT
Stanford-Binet																		
IQ		*		*			*	*			*					*	*	
Animal House																		
Total Raw Score	*	*	*		*			*	*		*	*		*	*		*	*
		5,1,3,4,2						2,1,3			3,1,2			1,3,2			1,2	
Preschool Inventory																		
Total Right	*	*			*		*	*	*	*	*	*	*	*	*	*	*	*
								3,2,1			2,1,3			2,1,3			2,1	
Metropolitan																		
Word Meaning	*			*	*			*			*	*		*			*	
											3,2,1							
Listening	*	*		*	*		*		*		*	*		*			*	
								2,1,3			3,2,1							
Matching		*		*	*	*		*			*			*			*	
					5,3,1,4,2													

TABLE 11 (Continued)

Summary Table of Tables 5-10

Measures	Table 5 English 5 Groups			Table 6 Spanish 5 Groups			Table 7 Controls 3 Groups			Table 8 EngXSpnXCont Groups 1X2X3			Table 9 EngXSpnXCont Groups 1X2X3 Omitting Some			Table 10 EngXSpn Groups 1X2		
	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT
Metropolitan																		
Alphabet	*	*		*	*			* 2,3,1	*	*	* 2,1,3	*	*	* 2,1,3	*		*	
Numbers	*	*									2,3,1	*		2,3,1	*		2,1	*
Copying	*			*	*			*		*	* 3,2,1	*	*	*		*		
Total Subtest Score	*	*		*	*			* 2,1,3	*	*	*		*	*			*	
Gates-MacGinitie																		
Listening Comprehension	*	*		*	*		*	*			*			*			*	
Auditory Discrimination		*		*	*			* 2,3,1	*		*			*			*	
Visual Discrimination	*	*		*	*			*			*			*			*	
Following Directions		*			* 4,1,2,3,5	*		*			*			*			*	

TABLE 11 (Continued)

Summary Table of Tables 5-10

Measures	Table 5 English 5 Groups			Table 6 Spanish 5 Groups			Table 7 Controls 3 Groups			Table 8 EngXSpnXCont Groups 1X2X3			Table 9 EngXSpnXCont Groups 1X2X3 Omitting Some			Table 10 EngXSpn Groups 1X2		
	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT
Gates-MacGinitie																		
Letter Recognition	*	*	*	*	*			*		*	*	*	*	*	*		*	
		5,2,1,3,4									2,1,3			2,1,3				
Visual-motor Coordination	*	*	*	*	*			*			*			*			*	
		2,1,5,4,3																
Auditory Blending	*	*		*	*			*		*	*		*	*		*	*	
Word Recognition		*			*						*			*			*	
Total Weighted Score	*	*		*	*			*		*	*			*			*	
ITPA																		
Sum of Raw Scores		*			*			*		*	*		*	*		*	*	
Auditory Reception		*					*	*	*	*	*	*	*	*		*	*	*
								2,1,3			3,1,2						1,2	

TABLE 11 (Continued)

Summary Table of Tables 5-10

Measures	Table 5 English 5 Groups			Table 6 Spanish 5 Groups			Table 7 Controls 3 Groups			Table 8 EngXSpnXCont Groups 1X2X3			Table 9 EngXSpnXCont Groups 1X2X3 Omitting Some			Table 10 EngXSpn Groups 1X2		
	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT
ITPA																		
Visual Reception		*			*			*			*			*			*	
Visual Sequential Memory		*						*		*	*		*	*			*	
Auditory Association		*			*			*		*	*		*	*		*	*	
Auditory Sequential Memory		*	* 5,2,4,1,3		*			*		*	*		*	*		*	*	
Visual Association		*			*			*			*			*			*	
Visual Closure		*			*			*			*	* 3,2,1		*			*	
Verbal Expression		*								*	*			*			*	

TABLE 11 (Continued)

Summary Table of Tables 5-10

Measures	Table 5 English 5 Groups			Table 6 Spanish 5 Groups			Table 7 Controls 3 Groups			Table 8 EngXSpnXCont Groups 1X2X3			Table 9 EngXSpnXCont Groups 1X2X3 Omitting Some			Table 10 EngXSpn Groups 1X2		
	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT	G	T	GXT
ITPA																		
Grammatic Closure	*	*	* 5,1,3,4,2		*			*		*	*		*	*		*	*	
Manual Expression						* 3,4,1,2,5		*			*	* 3,2,1		*	* 3,2,1			

Legend:
Group numbers = same as in previous tables, except where noted
* = statistically significant difference ($p < .05$)
G = Group main effect test
T = Trial main effect test
G X T = Groups X Trial effect test
Group numbers, where there is a GXT difference = ordering of groups from greatest gain to least

3. Difference in elapsed time between the beginning of the intervention program and the date of pretesting
4. Difference in elapsed time between date of pretesting and date of postesting
5. Pretest score on the variable in question

The basic form of the equation identified as the Full Model is:

$$y = aA + bB + cC + dD + eE + fX_1 + gX_2 + hX_3 + iX_4 + jX_5 + F$$

where,

y = vector of gain (or loss) scores for each subject in the analysis

A = vector of IQ scores associated with each subject in y

B = vector of chronological ages

C = vector of lapse of time between intervention program and pretesting

D = vector of lapse of time between pre- and posttesting

E = vector of pretest scores on the variable in question

X_1 = 1 if scores are for member of group one, zero otherwise

X_2 = 1 if scores are for member of group two, zero otherwise

X_3, X_4 and X_5 = analogous to X_1 and X_2

F = residual vector which has as elements differences between observed and estimated values in y

a, b, c, d, etc. = unknown constants to be solved for by method of least squares

The second equation known as the Restricted Model is of the form:

$$y = aA + bB + cC + dD + eE + uU + G$$

where,

y, A, B, C, D, E, = as previously defined

U = unit vector (arrived at by combining X_1, X_2, etc.)

G = new residual

a, b, c, d, e, and u = same as previously

After the two sets of equations (Full and Restricted forms) are solved the predictive power of each set is compared by means of an F test. If there is a significant difference between the squares of the multiple correlation coefficients (or the minimized error sum of squares), then we can conclude that there is a difference in rate of gain between the groups. We then compare the size of the gain (or loss) associated with group membership (size of f, g, h, i, j) in order to determine which group treatment to recommend.

In reporting these analyses the group numbers have the same meaning as in the analyses of variance tables.

English Speaking Experimental Groups Comparison. Using the technique of multiple linear regression, as described above, the five English Speaking Experimental Groups were compared (Table 12). The analysis reveals significant statistical differences in group gains on variables and ordering of the groups, as follows:

	Group Order
Metropolitan	
Copying	2,3,4,5,1
Gates-MacGinitie	
Listening	3,4,5,1,2

TABLE 12

Multiple Correlation Coefficient Squared (RSQ) of Full and Restricted Models Comparing English Speaking Experimentals

Measures	Full Model RSQ	Restricted Model RSQ	Difference	Order of Groups (High to Low)
Metropolitan				
Word Meaning	.55154	.53106	.02048	
Listening	.61759	.59083	.02676	
Matching	.47424	.41016	.06408	
Alphabet	.40211	.28344	.11867	
Numbers	.54881	.50627	.04254	
Copying	.58969	.48966	.10003*	2,3,4,5,1
Total Subtest Score	.36499	.30848	.05651	
Gates-MacGinitie				
Listening Comprehension	.43048	.30389	.12659*	3,4,5,1,2
Auditory Discrimination	.53233	.52336	.00897	
Visual Discrimination	.45352	.41947	.03405	
Following Directions	.23338	.19900	.03438	
Letter Recognition	.43500	.28460	.15040*	2,5,3,1,4
Visual-motor Coordination	.48041	.42014	.06027	
Auditory Blending	.45105	.28757	.16348*	3,4,5,2,1
Word Recognition	.34827	.23268	.11559	
Total Weighted Score	.26805	.16604	.10201	
ITPA				
Sum of Raw Scores	.50274	.44210	.06064	
Auditory Reception	.41459	.33187	.08272	
Visual Reception	.57947	.55644	.02303	
Visual Sequential Memory	.29951	.27820	.02131	
Auditory Association	.32030	.28488	.03542	
Auditory Sequential Memory	.40783	.27735	.13048*	5,2,4,3,1
Visual Association	.56251	.50540	.05711	
Visual Closure	.29154	.26085	.03069	
Verbal Expression	.57115	.45355	.11760*	4,3,2,5,1
Grammatic Closure	.33431	.26393	.07038	
Manual Expression	.38976	.32446	.06530	

* Significant, $p < .05$

	Group Order
Letter Recognition	2,5,3,1,4
Auditory Blending	3,4,5,2,1
Illinois Test of Psycholinguistic Ability	
Auditory Sequential Memory	5,2,4,3,1
Verbal Expression	4,3,2,5,1

This is something of a different picture from that obtained by analysis of variance. (See Table 5 for groups by trials differences.)

Spanish Speaking Experimentals. Multiple linear regression analysis, comparing the five Spanish Speaking Experimental Groups (Table 13), reveals significant statistical differences in group gains on variables and ordering of the groups as follows:

	Group Order
Metropolitan	
Alphabet	5,3,4,2,1
Total Subtest Score	3,5,4,2,1
Gates-MacGinitie	
Visual-motor Coordination	3,2,5,4,1
Illinois Test of Psycholinguistic Ability	
Auditory Reception	2,1,5,4,3

Again these results are quite different from straight analysis of variance. (See Table 6.)

Controls. Multiple linear regression analysis, comparing the three control groups (Table 14), reveals significant statistical

TABLE 13

Multiple Correlation Coefficient Squared (RSQ) of Full and Restricted Models Comparing Spanish Speaking Experimentals

Measures	Full Model RSQ	Restricted Model RSQ	Difference	Order of Groups (High to Low)
Metropolitan				
Word Meaning	.38668	.35671	.02997	
Listening	.48742	.46[illegible]42	.01797	
Matching	.45102	.3[illegible]545	.06557	
Alphabet	.59131	.50509	.08622*	5,3,4,2,1
Numbers	.42489	.39018	.03471	
Copying	.22745	.20313	.02432	
Total Subtest Score	.48335	.37932	.10403*	3,5,4,2,1
Gates-MacGinitie				
Listening Comprehension	.30383	.29136	.01247	
Auditory Discrimination	.52447	.51546	.00901	
Visual Discrimination	.48586	.39897	.08689	
Following Directions	.30765	.25312	.05453	
Letter Recognition	.49914	.43768	.06146	
Visual-motor Coordination	.41003	.25954	.15049*	3,2,5,4,1
Auditory Blending	.44990	.34913	.10077	
Word Recognition	.46459	.41778	.04681	
Total Weighted Score	.31971	.24314	.07657	
ITPA				
Sum of Raw Scores	.48714	.45119	.03595	
Auditory Reception	.51308	.40133	.11175*	2,1,5,4,3
Visual Reception	.43277	.36649	.06628	
Visual Sequential Memory	.54899	.52479	.02420	
Auditory Association	.22376	.18717	.03659	
Auditory Sequential Memory	.23904	.20323	.03581	
Visual Association	.54888	.53701	.01187	
Visual Closure	.13411	.05042	.08369	
Verbal Expression	.33693	.30695	.02998	
Grammatic Closure	.31950	.29889	.02061	
Manual Expression	.36625	.27183	.09442	

* Significant, p < .05

TABLE 14

Multiple Correlation Coefficient Squared (RSQ) of Full and Restricted Models Comparing Controls

Measures	Full Model RSQ	Restricted Model RSQ	Difference	Order of Groups (High to Low)
Metropolitan				
Word Meaning	.62719	.58184	.04535	
Listening	.67405	.56536	.10869*	2,1,3
Matching	.28575	.14015	.14560	
Alphabet	.43723	.32339	.11384	
Numbers	.41096	.29130	.11966	
Copying	.19598	.17557	.02041	
Total Subtest Score	.37169	.15629	.21540*	2,3,1
Gates-MacGinitie				
Listening Comprehension	.22458	.18495	.03963	
Auditory Discrimination	.41428	.32959	.08469	
Visual Discrimination	.29870	.28950	.00920	
Following Directions	.73559	.70154	.03405	
Letter Recognition	.23721	.19498	.04223	
Visual-motor Coordination	.37444	.37394	.00050	
Auditory Blending	.25030	.24235	.00795	
Word Recognition	.43895	.34622	.09273	
Total Weighted Score	.24573	.19914	.04659	
ITPA				
Sum of Raw Scores	.25260	.15871	.09389	
Auditory Reception	.49951	.21945	.28006*	2,1,3
Visual Reception	.48353	.39374	.08979	
Visual Sequential Memory	.34593	.32874	.01719	
Auditory Association	.16439	.15246	.07911	
Auditory Sequential Memory	.07911	.05696	.03408	
Visual Association	.46801	.41287	.05514	
Visual Closure	.16671	.15005	.01666	
Verbal Expression	.31845	.31612	.00233	
Grammatic Closure	.40315	.35909	.04406	
Manual Expression	.18687	.16005	.02682	

* Significant, $p < .05$

differences in group gains on variables and ordering of the groups, as follows:

	Group Order
Metropolitan	
Matching	2,1,3
Total Subtest Score	2,3,1
Illinois Test of Psycholinguistic Ability	
Auditory Reception	2,1,3

See Table 7 for a comparison with analysis of variance results.

Experimentals versus Controls. As was done in Tables 8 and 9, Experimentals were compared with Controls in two fashions: 1) in one analysis, all Controls were included (Table 15) and 2) in the other the English Unmonitored Group was omitted (Table 16). The results of these analyses were as follows:

	Group Order	
	All Controls Included	Part of Controls Omitted
Metropolitan		
Listening	3,1,2	not significant
Alphabet	2,1,3	2,1,3
Numbers	2,3,1	2,3,1
Copying	2,3,1	not significant
Total Subtest Score	2,1,3	2,1,3
Gates-MacGinitie		
Letter Recognition	2,1,3	2,1,3
Total Weighted Score	2,1,3	2,1,3

TABLE 15

Multiple Correlation Coefficient Squared (RSQ) of Full and Restricted Models Comparing Experimentals and Controls

Measures	Full Model RSQ	Restricted Model RSQ	Difference	Order of Groups (High to Low)
Metropolitan				
Word Meaning	.45883	.45151	.00732	
Listening	.52012	.47645	.04367*	3,1,2
Matching	.31888	.30458	.01430	
Alphabet	.38280	.21446	.16834*	2,1,3
Numbers	.39789	.33691	.06098*	2,3,1
Copying	.22200	.18727	.03473*	2,3,1
Total Subtest Score	.26487	.22356	.04131*	2,1,3
Gates-MacGinitie				
Listening Comprehension	.22977	.22783	.00194	
Auditory Discrimination	.43890	.43561	.00329	
Visual Discrimination	.31580	.30867	.00713	
Following Directions	.34730	.34542	.00188	
Letter Recognition	.32703	.11052	.21651*	2,1,3
Visual-motor Coordination	.28751	.28582	.00169	
Auditory Blending	.25793	.23872	.01921	
Word Recognition	.29599	.29573	.00026	
Total Weighted Score	.14429	.09982	.04447*	2,1,3
ITPA				
Sum of Raw Scores	.34029	.31197	.02832*	3,1,2
Auditory Reception	.30461	.22645	.07816*	3,1,2
Visual Reception	.42109	.41772	.00337	
Visual Sequential Memory	.32792	.32532	.00260	
Auditory Association	.19697	.17789	.01908	
Auditory Sequential Memory	.15050	.14879	.00171	
Visual Association	.48959	.48296	.00663	
Visual Closure	.12507	.08858	.03649*	3,2,1
Verbal Expression	.33058	.31987	.01071	
Grammatic Closure	.25768	.24231	.01537	
Manual Expression	.24060	.18863	.05197*	3,2,1

* Significant, $p < .05$

TABLE 16

Multiple Correlation Coefficient Squared (RSQ) of Full and Restricted Models Comparing Experimentals and Controls (Omitting English Unmonitored)

Measures	Full Model RSQ	Restricted Model RSQ	Difference	Order of Groups (High to Low)
Metropolitan				
Word Meaning	.46396	.45981	.00410	
Listening	.53222	.52981	.00240	
Matching	.34582	.33486	.01096	
Alphabet	.39548	.23131	.16420*	2,1,3
Numbers	.39514	.32978	.06540*	2,3,1
Copying	.26611	.23960	.02650	
Total Subtest Score	.29547	.21572	.07970*	2,1,3
Gates-MacGinitie				
Listening Comprehension	.24002	.23717	.00285	
Auditory Discrimination	.45650	.43964	.01686	
Visual Discrimination	.36350	.35840	.00510	
Following Directions	.36608	.36406	.00202	
Letter Recognition	.34059	.16931	.17130*	2,1,3
Visual-motor Coordination	.29295	.29245	.00050	
Auditory Blending	.26352	.23841	.02511	
Word Recognition	.28428	.28080	.00348	
Total Weighted Score	.19326	.12082	.07240*	2,1,3
ITPA				
Sum of Raw Scores	.18882	.18036	.00846	
Auditory Reception	.20938	.18727	.02211*	1,3,2
Visual Reception	.31938	.31573	.00365	
Visual Sequential Memory	.31809	.31803	.00006	
Auditory Association	.16398	.14138	.02260*	1,3,2
Auditory Sequential Memory	.13125	.12754	.00471	
Visual Association	.46158	.46125	.00033	
Visual Closure	.10553	.08588	.01965	
Verbal Expression	.30009	.28252	.01757	
Grammatic Closure	.20669	.19237	.01432	
Manual Expression	.19514	.15263	.04251*	3,2,1

* Siginificant, $p < .05$

	Group Order	
	All Controls Included	Part of Controls Omitted
Illinois Test of Psycholinguistic Ability		
Sum of Raw Scores	3,1,2	not significant
Auditory Reception	3,1,2	1,3,2
Visual Closure	3,2,1	not significant
Manual Expression	3,2,1	3,2,1

Since there were differences between Experimentals and Controls in rate of gain and the Experimentals were divided for purposes of the analysis into English and Spanish Experimentals, it became important to decide where the division was. The questions asked were some variation of the following: 1) Are the Experimentals likely to have come from the same population, or 2) Are all three groups different populations? The following are the results:

	Group Order	
	All Controls Included	
Metropolitan		
Listening	3,1,2	1 & 2 same population
Alphabet	2,1,3	1 & 2 same population
Numbers	2,3,1	1 & 3 same population
Copying	2,3,1	1 & 3 same population
Total Subtest Score	2,1,3	1 & 3 same population
Gates-MacGinitie		
Letter Recognition	2,1,3	1 & 2 same population
Total Weighted Score	2,1,3	1 & 2 same population

	Group Order	Part of Controls Omitted
Metropolitan		
Alphabet	2,1,3	1 & 2 same population
Numbers	2,3,1	1 & 3 same population
Total Subtest Score	2,1,3	All groups different
Gates-MacGinitie		
Letter Recognition	2,1,3	1 & 2 same population
Total Weighted Score	2,1,3	1 & 2 same population

Conclusions

In doing intervention studies it is desirable to have comparable groups, but in dealing with human subjects it is often impractical to equate the groups on the variables of interest at pretesting. Such a situation was found to be true in the present study--the subject groups differed widely on many variables at pretesting (Tables 1-4). Therefore, we have to draw our conclusions concerning the intervention program as to differing populations, and the question becomes: Given that treatment groups differ at pretesting, does the intervention program have differential effects on these groups?

One of the initial hypotheses was that the achievement of the Experimental classes as measured by selected language development tests would support a ranking in the effectiveness of the treatment methods as follows (most effective to least effective): 5,4,3,2, and 1. However, this hypothesis finds little support in the analysis of results.

The answer is the same whether one looks at the results as to English or Spanish Speaking Experimentals; nor does it make a difference whether one analyzes the data by analysis of variance or multiple linear regression.

In one instance there seems to be meaningful support for the hypothesis stated above. It occurs in the gains of the Spanish Experimentals on the Alphabet and Total Subtest Score of the Metropolitan. The ordering of the groups is:

	Group Order
Metropolitan	
Alphabet	5,3,4,2,1
Total Subtest Score	3,5,4,2,1

which is not too far removed from the hypothesis to lend some credence to it as to such a population. The reader will recall that the analysis leading to this result controls statistically for important variables between the groups.

By analysis of variance comparing the English Experimentals it would appear that something might be happening in Group 5, since this group had the highest gain on 3 out of 4 of the variables where there were differences. However, this apparent effect is absent when contaminating variables are controlled for by multiple linear regression.

Another hypothesis was that Experimentals, who received the language development program, would show more improvement than

Controls, who were in the Head Start Program but did not receive the structured program described. This hypothesis is supported by the analyses, (Tables 8, 9, 15 and 16). In some instances, however, the Controls showed more improvement. But this unpredicted effect drops out in every instance, except the Manual Expression Subtest of the ITPA, if the effects of the English Unmonitored Control Class are dropped from the analysis. This same Control Class showed superior improvement to the other two Control Classes in every instance where there were statistical differences (Tables 7 and 14). This suggests that a superior program, either in terms of the curriculum or the teacher variables, was operative in the English Unmonitored Control Class.

Since all analyses showed highly significant trial differences, and national norms are available, it is possible to answer the question: How did this Head Start population compare with national normative samples at the beginning and conclusion of the program? And also answer the question of what effect Head Start had generally on the population in question.

Table 17 is a comparison of the various groups with national norms on the Metropolitan and Gates-MacGinitie.

The groups with reference to national norms on the Stanford-Binet and Illinois Test of Psycholinguistic Ability are compared in Table 18.

TABLE 17

Comparison of Subjects with National Norms

on the Metropolitan and Gates-MacGinitie

	Pretesting			Posttesting		
Instrument	Mean	SD	Percentile	Mean	SD	Percentile
Metropolitan Total Subtest Score						
National Sample	54+	20	50	54+	20	50
English Experimentals	40	12	23	45	13	31
Spanish Experimentals	41	11	25	48	12	36
Controls	35	10	16	41	11+	25
Gates-MacGinitie Total Weighted Score						
National Sample	65	20	50	65	20	50
English Experimentals	48	13	21	58	16	38
Spanish Experimentals	48	11	21	58	13	38
Controls	42	10+	14	49	11	21

TABLE 18

Comparison of Subjects with National Norms

on the Stanford-Binet and ITPA

	Total Population	English Experimentals	Spanish Experimentals	Control Groups
Stanford-Binet				
Pretesting:				
Chronological Age	67.26	66.46	67.45	67.86
Mental Age	59.06	59.93	57.76	59.50
IQ	86.71	89.13	84.29	86.72
Posttesting:				
Chronological Age	72.80	72.34	73.12	72.94
Mental Age	65.50	66.76	63.62	66.11
IQ	89.00	91.47	85.70	89.83
ITPA				
Pretesting:				
Chronological Age	70.38	69.54	70.68	70.91
Psycholinguistic Age	62.36	63.78	60.11	63.18
Posttesting:				
Chronological Age	74.65	74.00	75.05	74.91
Psycholinguistic Age	68.94	69.80	66.32	70.71
Time between Tests S-B	5.54	5.88	5.67	5.08
Mental Age Change S-B	6.43	6.83	5.86	6.61
Time between ITPA's	4.28	4.46	4.37	4.00
Psycholinguistic Age Change	6.59	6.02	6.21	7.53

In reading Tables 17 and 18, the reader should bear in mind that the intervention program with Experimentals was begun before pretesting. If we assume that Experimentals began at the same level of reading readiness as the Controls, it seems fair to conclude that Head Start in this setting moves children from about the 15th percentile to about the 23rd percentile in reading readiness, without the language intervention program, but moves them to about the 35th percentile rank with the language intervention program. It also seems fair to conclude there is an unexpected increase in Mental Age of .9 of a month (6.43 - 5.54), and an unexpected increase in Psycholinguistic Age of 2.31 months (6.59 - 4.28).

One of the objectives of Head Start is to improve the cognitive coping ability of its students in the public school system, and the real test of the value of the intervention program will come in following these subjects into the school system and seeing how they fare. Such a follow-up in the future is definitely recommended.

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APPENDIX

The professional examiners, observers, and interviewers assisting with the 1968-69 evaluation were recruited primarily from the post graduate student population of The University of Texas at Austin. Contributing time and aid to this effort were three CDERC staff members, Miss Ann Maurer, Mr. Richard Reposa, and Mr. Thad Eckman.

The theme of the 1968-69 national evaluation was "Inter-Center Conformity." The Evaluation Coordinator, Mrs. Nancy Cross, attempted to monitor the training of the professional staff to adhere to this theme. Careful attention was given to training and retraining the professional staff to achieve high reliability among them. Training was conducted by Mr. Swen Helge, a Ph. D. candidate in Educational Psychology, Mrs. Martha Haar, a doctoral student in Educational Psychology, personnel from other E & R Centers and the Evaluation Coordinator, Mrs. Cross. Because many new examiners were recruited for posttesting, the training sessions were repeated prior to the start of posttesting.

The following is a list and brief description of the professional staff participating in the 1968-69 National Evaluation of Head Start.

Stanford-Binet Trained Examiners

1. Dixie Lynn Boring holds a Bachelor of Arts degree in Psychology from The University of Texas at Austin. Miss Boring took the individual testing course as part of her work towards a Master's Degree in Educational Psychology. She helped with pre- and posttesting.

2. Thad Allen Eckman, Jr., employed half time by CDERC, holds a Bachelor of Arts Degree in Psychology from California Lutheran College. Mr. Eckman is in his second year of doctoral studies at The University of Texas at Austin.

3. Elizabeth Edwards holds a Bachelor of Arts degree in Elementary Education from Baylor University. Miss Edwards is currently doing post graduate study in diagnostic reading. She administered post Stanford-Binets.

4. William S. Hanna earned his Master of Arts degree from San Diego State College in 1957. Mr. Hanna is currently a candidate for a doctorate degree in Educational Psychology. He was trained on all instruments and worked throughout the year with our evaluation.

5. John W. Hickman is a doctoral student in Educational Psychology at The University of Texas at Austin. He holds a Bachelor of Arts degree in Psychology from Texas A & I and a Master of Arts degree in Special Education from UT. Specializing in counseling, Mr. Hickman has extensive course work in individual testing and working only during posttesting.

6. Darla Hilton is working for her Master of Arts degree in Speech Pathology at The University of Texas at Austin. Miss Hilton has 400 clinical hours experience in therapy and evaluation. She participated in both pre- and posttesting.

7. Martin Kaufman earned his Master of Education degree in 1965. He is currently a doctoral student in Special Education. Mr. Kaufman has had two individual testing courses and administered post Stanford-Binets for our evaluation.

8. Dixie McCoulskey holds a Bachelor of Science degree in Education from Southwest Texas State College. Mrs. McCoulskey has worked as a Psycholinguistic Specialist for a Texas School District and is currently in Graduate School at The University of Texas at Austin, working for a degree in Special Education with a major in Mental Retardation.

9. Mack McCoulskey is working for his doctorate degree in Special Education. Mr. McCoulskey holds a Bachelor of Science degree in Education and a Master of Education in Special Education. He has served as assistant for the individual testing course, as well as doing evaluations with blind children and children with cerebral palsy. Mr. McCoulskey administered the Stanford-Binet during posttesting.

10. Mary Louise Ririe is presently working on her Master of Arts degree in Special Education with a major in Mental Retardation at The University of Texas at Austin. She holds a Bachelor of Arts degree in Psychology from UT. Miss Ririe worked during the posttesting period.

11. R. Daniel Schott earned his Bachelor of Arts degree in Psychology in 1968 from The University of California at Santa Barbara. Mr. Schott is currently studying clinical psychology in a Ph. D. program in The University of Texas Southwestern Medical School at Dallas.

12. Bennett Scott, a Ph. D. candidate in Educational Psychology at The University of Texas at Austin, has a Bachelor of Arts degree in Psychology and a Master of Education in Educational Psychology from the University. Mr. Scott participated during pretesting.

13. Lynn Shelor received her Bachelor of Arts degree in Psychology from the University of Houston in 1967. She is presently a graduate student in Educational Psychology at The University of Texas at Austin. Mrs. Shelor worked during the pretesting period.

14. Patti Smith holds a Bachelor of Science degree in Speech from The University of Texas at Austin and is presently working toward her Master of Arts in Speech Pathology. Mrs. Smith tested during the posttesting period.

15. Susan J. Smith received her Bachelor of Science degree in Communications (Speech Pathology and Audiology) from The University of Texas at Austin and is presently working toward a Master of Arts degree in the same field. Miss Smith worked during pre- and posttesting.

16. Judy Ann Willingham is working towards her Master of Arts degree in Educational Psychology. She has had three courses in individual testing. Mrs. Willingham participated during posttesting.

17. Isabelle Navar Wheaton is a Ph. D. candidate in Educational Psychology at The University of Texas at Austin. Mrs. Wheaton worked during pre- and posttesting.

18. Martha Wofford received her Master of Arts degree in Speech Pathology and Audiology in June, 1969. Mrs. Wofford participated in the evaluation during pre- and posttesting.

19. Fran Hammer (no information available) helped during pre- and posttesting and did pre- parent interviews.

Other Examiners

1. Marcia Boles, a third year psychology student, worked during pre- and posttesting administering primarily the Gumpgookies and the Sociometric instruments.

2. Ruth Bryant holds a Bachelor of Arts degree in Economics from the University of Redlands and a Master of Arts degree in Educational Psychology from The University of Texas at Austin. A psychometrist at the UT Counseling Center, Mrs. Bryant helped with the evaluation during pretesting.

3. Claire A. Graber, a citizen of Switzerland worked during pretesting administering the Gumpgookies. Mrs. Graber had one year of graduate study in clinical psychology at the University of Lausanne.

4. Nova Hanna, a pediatric's nurse, worked during pre- and posttesting, administering several different instruments. Mrs. Hanna has had two years of college study.

5. Brenda Watson Hassell has had three years study at East Texas State University. She spent three years working as a dental assistant. Mrs. Hassell worked during pre- and posttesting.

6. Chester Wyn Moore, a candidate for a Bachelor of Arts degree in Psychology from The University of Texas at Austin in August, 1969, worked during the posttesting period. Mr. Moore has had a year's experience working with emotionally disturbed children.

7. Joel Gartman Saegert has a Bachelor of Arts degree in Psychology and two years graduate work in Psychology at The University of Texas at Austin. Mr. Saegert worked during both pre- and posttesting periods.

8. Karolyn Stark, a psychology student at The University of Texas at Austin, administered Gumpgookies and the Preschool Inventory during posttesting.

9. Dennis Ray Wheaton, doing graduate study in American Civilization, has worked with children through the Human Rights Center. Mr. Wheaton worked during pre- and posttesting.

Interviewers

1. Nita Bounds, a senior in the Department of Special Education at The University of Texas at Austin, has taught typing for government employees and has interviewing experience with the U. S. Army GED Program.

2. Gloria Des Rochers is an occupational therapy aide at the Austin Cerebral Palsy Center where she has done extensive interviewing. Mrs. Des Rochers has had three and one-half years undergraduate study in Sociology at Merrimack.

3. Joyce Dudas is a graduate student in the Speech Department at The University of Texas at Austin. During clinical experience at The University Speech Clinic, Miss Dudas has had much interviewing experience.

4. Roslyn Freeman, a senior Speech Pathology major at The University of Texas at Austin, has two years interviewing experience with clients at The University Speech Clinic.

5. Barbara Diane Grimes holds a Bachelor of Science degree in Speech and Hearing Therapy from The University of Texas at Austin. Miss Grimes has had two years experience at the Austin Cerebral Palsy Center.

6. Ruth Hood is doing post graduate study in Speech Pathology at The University of Texas at Austin. Miss Hood is a speech therapist with the Austin Cerebral Palsy Center.

7. James C. Henry received his Master of Science degree in Social Work from The University of Texas at Austin in May, 1969. Mr. Henry has done casework with the Arizona Department of Public Welfare.

8. Suzanne K. Hinds received her Master of Science degree in Social Work from The University of Texas at Austin in May, 1969. Miss Hinds has experience as a Public Assistance Worker for the Texas Department of Public Welfare.

9. Kandace A. Penner has conducted parent conferences and interviews for speech diagnoses as part of her work for her Bachelor of Science degree in Speech Pathology. Miss Penner is presently doing graduate study in Speech Pathology and Audiology at The University of Texas at Austin.

10. Barbara Ann Reynolds is a Master's student in the School of Social Work at The University of Texas at Austin. Mrs. Reynolds has served as a School Social Worker.

11. Mary Helen Valadez holds a Bachelor of Arts degree in Sociology from The University of Texas at Austin. Currently a student in the UT School of Social Work, Mrs. Valadez has extensive experience as a social worker.

12. Carlos Vargas is a graduate student in Linguistics at The University of Texas at Austin. Mr. Vargas conducted pre-interviews.

OSCI Observers

1. Nancy Cross, the CDERC Evaluation Coordinator, was trained for OSCI observations. A certified secondary teacher, Mrs. Cross is the data processing specialist for the Center.

2. Thad A. Eckman, a CDERC staff member, did OSCI observations in addition to testing.

3. Ann L. Maurer, a CDERC staff member, holds a Master's Degree in Social Work and has certification in that area. Miss Maurer did OSCI observations during the 1967-68 evaluation and helped field test the 1968-69 OSCI instrument.

4. Richard E. Reposa, a CDERC staff member, is a Linguistic Specialist. Mr. Reposa has served as Intervention Coordinator as well as doing OSCI observations.